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LIPEMIC NEPHROSIS

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THIRTY-FOUR children ill with lipemic nephrosis have been studied during the past twelve years. The survey excludes cases of glomerulonephritis which secondarily developed the nephrotic syndrome, but includes those of primary lipemic nephrosis even though in some instances symptoms of nephritis may have occurred during the later stages of the illness.

The existence of *lipemic nephrosis as a definite clinical entity* has not been unanimously accepted. Most internists believe that the disease is a manifestation of chronic nephritis,[1] whereas the majority of pediatricians are of the opinion that it represents a clinical as well as a pathologic entity.[2] We share the latter belief and explain the divergence of opinions by the fact that lipemic nephrosis is predominantly a disease of *early* childhood and is very rare or possibly nonexistent in adults. The ultimate decision as to whether lipemic nephrosis is a clinicopathologic entity rests mainly on the pathologic evidence.

Of the ten deaths of children in this series autopsies were performed in six. In three of these six autopsies there was neither gross nor microscopic evidence of inflammatory disease in the kidneys.* In these three cases death occurred early in the course of the disease, i.e., three, five, and six weeks after the onset, respectively. In two, the death was due to the mercurial diuretic salyrgan, and in one to bronchopneumonia. Sections were stained with hematoxylin eosin, azocarmine, and sudan IV. The glomeruli were normal, the basement membranes were not thickened and there was no interstitial infiltration. Because of the fact that the basement membranes were entirely normal, we cannot agree with Bell[3] and Fahr[1] who believe that the thickened glomerular basement membrane is the basic and essential lesion in the nephrotic kidney. Our findings are in agreement with those of Kantrowitz and Klemperer[4a] and

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of Wolbach and Blackfan,[4b] from which it can be concluded that anatomically lipemic nephrosis is a noninflammatory lesion of the tubular apparatus, often being present without any microscopic evidence of glomerular or interstitial inflammation. The other three children on whom autopsies were performed died from intercurrent infections. One had bronchopneumonia; one, bronchopneumonia following measles; and the other, pneumococcic peritonitis and septicemia, death occurring one and one-half, six, and thirteen months, respectively, after the onset of the renal disease. Histologic examination revealed marked nephrosis and also inflammatory disease. The nephritic lesions in these kidneys were described by Drs. H. Goldblatt and T. C. Laipply as slight, acute pyelonephritis in one instance, as acute, proliferative glomerulonephritis with slight, chronic, interstitial nephritis in the second, and as chronic pyelonephritis with marked fibrosis of the glomeruli in the third. Only in the first of these three cases were the glomerular basement membranes found to be thickened. From the point of view of the pathologists, the diagnosis in these instances is interstitial nephritis rather than glomerulonephritis.

Our clinical observations in twenty-one of our patients coincide with the anatomic picture. Four to eighteen months of uninterrupted observation included daily urinalyses and blood pressure readings and weekly blood chemistry determinations. Fourteen of these children were at all times free of nephritic symptoms. In three others there were some signs of nephritis at the onset, the duration of which varied from ten days to six months. These three children presented from then on the symptomatology of lipemic nephrosis exclusively. In the other four patients, there was a transient episode of nephritis during the late stages of the nephrosis.

Both the anatomic and the clinical observations justify our conclusion that lipemic nephrosis often occurs without the added presence of nephritis, and that it is a clinicopathologic entity, often combined with, but as such unrelated to chronic nephritis.

The *clinical diagnosis of an additional nephritis* in lipemic nephrosis often requires months of study. It is obvious that more than an occasional red blood cell, often observed in a normal centrifuged urine specimen, should not be found in the urine of a patient suffering from nephrosis. We noted, however, that the absence of erythrocyturia for several weeks did not exclude the possibility of the additional existence of nephritis. In one of the three nephritis cases, in which an autopsy was performed, erythrocyturia was absent during six weeks of observation. In one other it had been observed for only four weeks, ten months prior to death. Within the last three months of life this patient's urine was free of red blood cells and yet the microscopic examination of the kidneys revealed pyelonephritis and glomerulonephritis. In the absence of erythrocyturia repeated readings of the blood pressure, nonprotein nitrogen or blood urea nitrogen and creatinine determinations in the blood over extended periods are necessary to solve the diagnostic problem. In cases of additional interstitial nephritis the values may be moderately increased and fluctuate, usually unobserved in uncomplicated glomerulonephritis (Table I). It is our

TABLE 1. CASES OF LIPEMIC NEPHROSIS WITH ADDITIONAL NEPHRITIS SHOWING MODERATE INCREASE AND FLUCTUATION OF NONPROTEIN NITROGEN AND CREATININE VALUES

DATE	NAME	AGE IN YEARS	SEVERITY OF NEPHROSIS	URINE SEDIMENT		BLOOD PRESSURE	SERUM MG. PER 100 C.C.		
				R.B.C.	W.B.C.		N.P.N.	U.N.	CREATININE
2-15-43	J. D. G.*	2	4+	+	2+		54	32	1.4
2-16-43				2+	3+		56	40	1.5
2-23-43				0	+		47		
3- 8-43				0	–		28		
3-23-43				0	–		36		1.0
4- 8-43				+	+		45		
4-12-43				2+	+		64		
4-17-43				few	+		47		
4-23-43				2+	+		48		1.9
5- 3-43							72		1.4
5- 7-43				2+	+		56		1.2
5-10-43				2+	few		40		
5-21-43				2+	few		78		
6- 3-43				2+	few		76		1.5
7- 3-44	R. O.	1½		few	+		30	15	1.2
7-10-44				few	2+		78		
7-17-44				–	few		46		
7-24-44				–	few		33		
7-31-44				–	–	90/40	23		1.2
10-23-36	G. M.	13	2+	+	–	130/90	28		
10-26-36				few	–	130/90	29		
11-30-36				–	few	130/90	42		
12- 7-36				–	few	125/80	47		
10-19-43	B. B.	2	4+	–	–	110/70	36		0.9
10-26-43				–	–	110/70	50		1.1
2-25-44				2+	+	105/90	35		
2-28-44				2+	3+	105/80	33		0.8
3-13-44				–	–	110/75	37		1.0
3-22-44				few	–	95/40	38		1.1
3-27-44					–	90/40	43		
4- 3-44				few	–	90/40	35		1.1
4-10-44				0	–	90/45	36		1.0
4-17-44				0	–	90/55	35		1.0
6-19-44				0	–	90/40	26		
7-10-44				0	–	80/40	55	30	
8- 7-44				0	–	100/45	27		0.8
9-11-44				0	–	90/55	28		0.8
5-20-33	F. B.*	3	3+	–	3+	100/70	29		
7-27-33				–	2+	120/70	63		
8- 5-33				few	2+	100/70	47		
9-11-33				few	+	110/90	69		
8-15-33	H. R.*	2½	3+	+	+		76		
8-24-33				+	2+		92		
9- 5-33				2+	+		46		

*Diagnosis confirmed by microscopic examination of the kidneys.

impression that the fluctuation found in nitrogen retention and creatinine values is quite characteristic for this type of nephritis.

The *etiology* of genuine lipemic nephrosis is unknown and our experience has yielded but little new knowledge. We believe that the disease is not so rare in children as is generally assumed. During the last twelve years 115 cases of glomerulonephritis and 34 of lipemic nephrosis were admitted to Babies and Childrens Hospital, Cleveland. In our hospital population the incidence of glomerulonephritis is consequently only 3.47 times more frequent. One important factor is that the incidence is greatest during the first two to three years

of life. Of the thirty-four cases, twenty-one (64 per cent) were under 3, seven (21 per cent) between 4 and 7 years and five (15 per cent) between 9 and 11 years of age at the time of onset. The highest incidence of the disease in our series occurred during the first three years of life. This might suggest the possibility that the biologic quality of young renal tissue is a predisposing factor.

Sixty-one per cent of the children were males. Twenty boys as compared to fourteen girls, does not, however, permit a conclusion as to sex predilection.

In 70 per cent of the children the first symptoms of nephrosis were observed during the first six months of the year, one-half of these having started in March and April. The prevalence of infections during these months might indicate a seasonal relationship but more data would be necessary to make this a fact.

Thirty-one of the children were white and 3 (9 per cent) were Negroes. Considering that among 434 consecutive admissions during 1944, 48 per cent of the ward population consisted of Negro children, it seems justifiable to conclude that lipemic nephrosis is rarely seen in the Negro race.

The *chronicity of the disease* is usually so outstanding that many clinicians speak of "chronic" nephrosis, which is unfortunately true in the majority of cases. Ten of our patients were observed throughout the course of the disease which varied from nine months to three and one-half years. But we have seen three patients who suffered from lipemic nephrosis for only two, four, and twelve weeks, respectively. Therefore, chronicity is not always characteristic and should not be included in naming the illness. Two of the children who had such a short course recovered spontaneously. Chart 1 shows the correlation of the blood chemistry and albuminuria in one of these patients during the process of rapid healing. An albuminuria of 17.6 Gm. protein per twenty-four-hour urine decreased overnight to 0.44 Gm. and the next day to 0.07 Gm. Three days later the urine was entirely free of albumin. In this case we are not even able to suspect the cause of the unexpected overnight cure. The third child, 1 year of age, received 3 grains of thyroid extract daily and after three to 7 days had fever, a marked loss in weight, acidosis and diarrhea. The administration of thyroid extract was discontinued, intravenous fluids administered, and food withheld. After this child had recovered from the intoxication, the urine was free of albumin and two weeks later the blood chemistry had returned to normal. She has remained well.

It has been claimed that unexpected cures may occur quite frequently under the influence of severe infections. It has even been recommended[2] to delay chemotherapy for that reason. We have cared for children ill with nephrosis complicated by severe infections such as pneumococcic peritonitis, pneumonia, empyema, otitis media, and others, but we have never seen a sudden cure follow such infections. Consequently we cannot support such a recommendation. Mumps occurred in two of our children and pertussis in two others. During the presence of these infections the edema increased markedly and the blood chemistry became worse. After they recovered from these infections their

nephrotic status was not worse, but certainly not better than it had been previously. Improvements and even cures in lipemic nephrosis have been reported[5] when the disease was complicated by measles. We have seen four nephrotic children contract measles in spite of one or two injections of 4 c.c. of immune globulin. One child died of a toxic pneumonia following measles. One other who became worse in every respect while he had morbilli recovered, but the status of the nephrosis had been unaffected. The observations made in the two remaining patients were quite astonishing. One patient (Chart 2), who had had a marked albuminuria uninterruptedly for over one year, contracted measles, and during this illness the urine was free of albumin for four days.

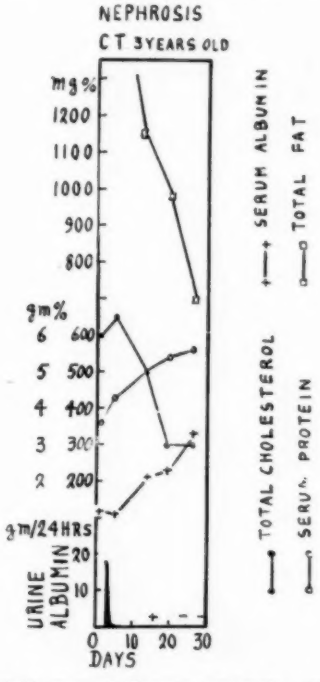

Chart 1.—Spontaneous overnight cure of lipemic nephrosis. Urine became free of albumin within three days, blood chemistry became normal within the next four weeks.

The total lipids and cholesterol decreased considerably, the serum proteins increased within three weeks to 4.5 Gm., and ascites and edema diminished rapidly. However, bronchopneumonia reversed the improvement to the premeasles status. This episode did not have any further influence on the course of her disease. The second patient, 2½ years old (Chart 3), improved even more remarkably. This boy's urine was free of albumin for eighteen days and the improvement in the blood chemistry was even more evident. A mild pharyngitis developed; however, he had a relapse and has had 1 plus to 2 plus albuminuria ever since. The rapidity with which the urine became albumin-free in these two children

was most spectacular. The unknown mechanism which causes the massive albuminuria of nephrosis must, therefore, be quite labile. If a severe infection, or measles, or thyroid intoxication can occasionally cause a sudden cure in nephrosis, it is well to consider that this may also happen spontaneously.

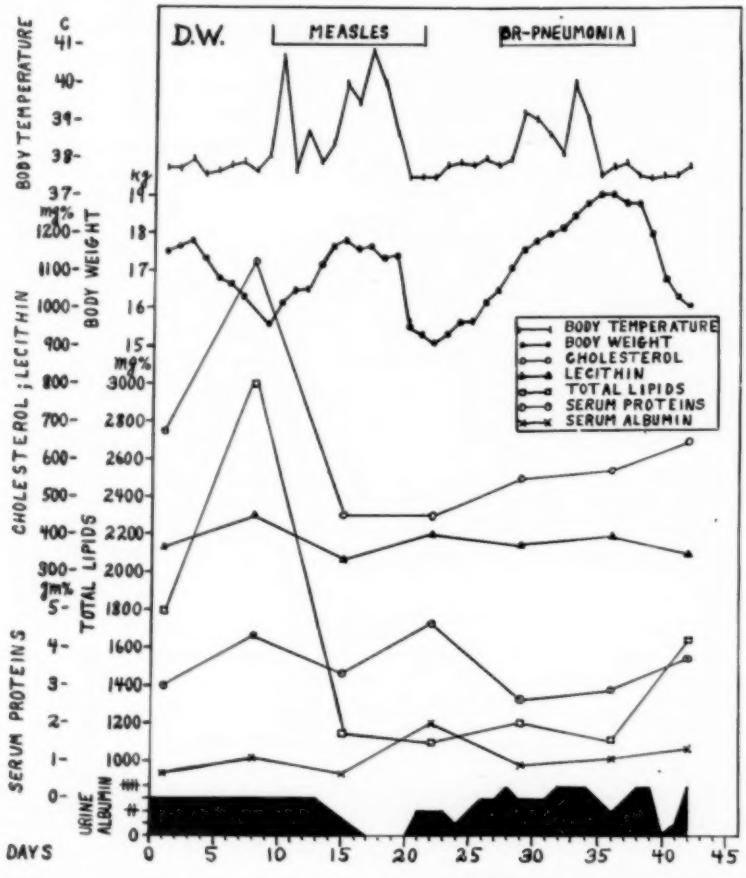

Chart 2.—Temporary improvement of lipemic nephrosis under the influence of measles.

The development of *edema* is, in nephrosis, generally explained by the diminished oncotic pressure resulting from the hypoproteinemia. In 1932, however, Fremont-Smith[6] pointed out that this mechanism is only one factor which facilitates edema formation "when the kidneys fail to respond to fluid intake with a normal diuresis." We can substantiate this conclusion with numerous observations. Four cases (three cases, Chart 4, and one, Chart 2), clearly demonstrate how the weight of these children varied independently from the hypoproteinemia and hypoalbuminemia. In accordance with another observation made

by Fremont-Smith and associates[6] we frequently found that if our patients acquired an infection, edema developed in from one to three days before the fever, at a time when serum protein and albumin values remained unchanged. We, furthermore, saw the edema disappear under the influence of daily plasma infusions (Chart 4) before the serum protein values had even begun to rise. The hypoproteinemia and hypoalbuminemia, therefore, cannot entirely explain the development of edema in nephrosis.

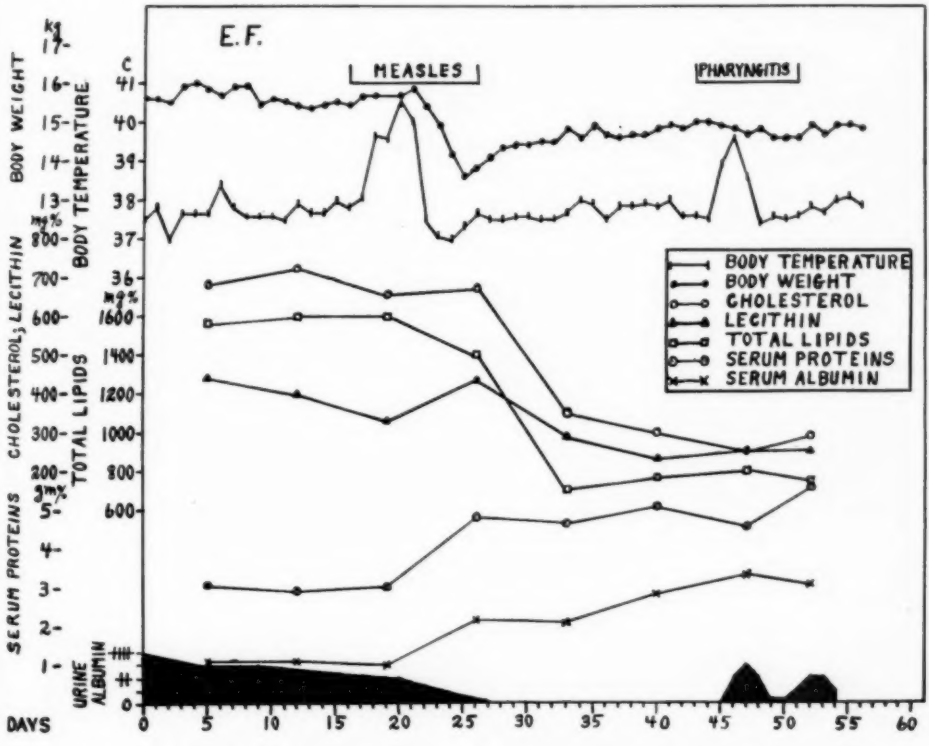

Chart 3.—Temporary improvement of lipemic nephrosis under the influence of measles.

The chemical composition of *ascitic fluids* obtained from three patients were analyzed. Fluid and serum were obtained on the same day for chemical analysis. The corresponding values (Table II) made it quite clear that the fluid represented an ultra filtrate of the blood. The milky appearance of the fluid was due to only very small amounts of lipids which, as far as cholesterol and lecithin are concerned, were often below the range of exact determination.

The hypoproteinemia also has been held responsible for the development of the *hyperlipemia*. This hypothesis was based on Fishberg's[7] experimental work. It has, however, been pointed out by others[8] that this hypothesis cannot be sufficiently supported by clinical data. We agree with this objection and

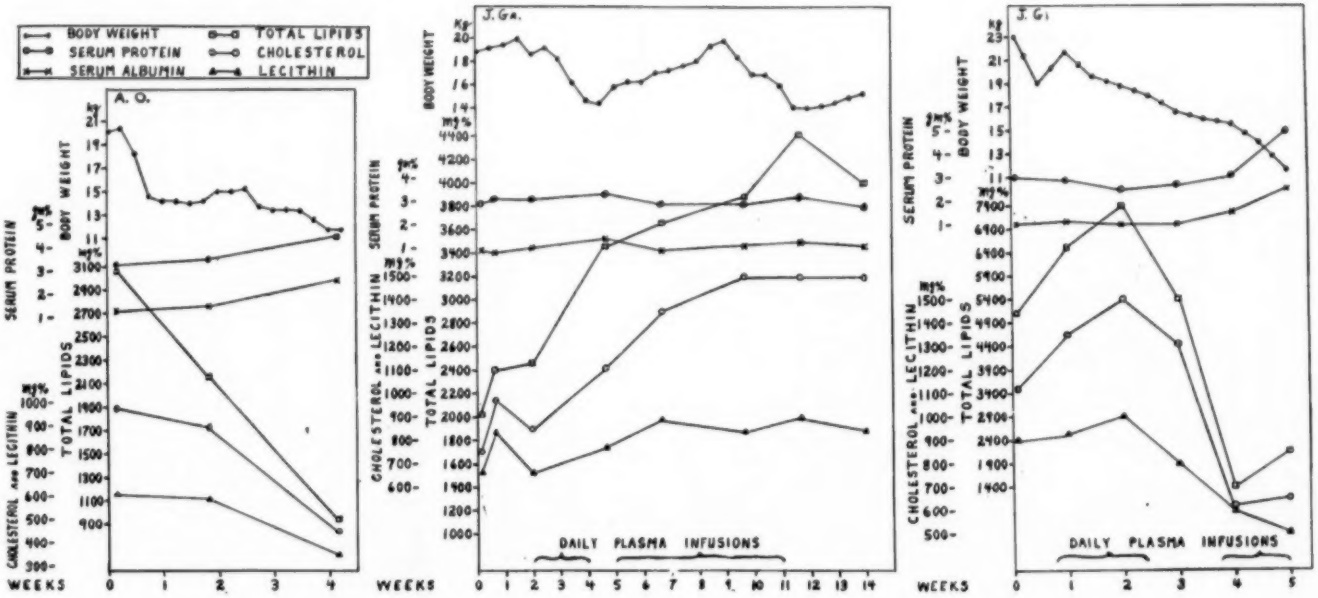

Chart 4.—Independence of body weight (ascites and edema) from hypoproteinemia and hypoalbuminemia.

TABLE II. COMPARATIVE CHEMISTRY OF ASCITES AND BLOOD SERUM IN LIPEMIC NEPHROSIS

	ASCITES								BLOOD SERUM				
NAME	PROTEIN GM. %	CHOL. MG. %	CHOL. ESTERS MG. %	TOTAL LIPID MG. %	LECITHIN MG. %	SPECIFIC GRAVITY	Na MG. %	Cl MG. %	SER. PROT. GM. %	CHOL. MG. %	CHOL. ESTERS MG. %	TOTAL LIPID MG. %	LECITHIN MG. %
D. W.	0.05	10	0	85	6.0				3.0	554		1,810	320
	0.075	30	13	110	9	1008	313		2.9	675	338	1,470	475
A. S.	0.056	15	6	180	0		325	435	2.5	675	412	3,570	580
	0.052	15	2	40	15	1008	300	440	2.6	810	412	4,900	700
B. B.	0.065	23	8	40	20	1006	308	400	2.9	780	300	1,910	490
	0.18	13		95	8		323	400	2.9	782		2,400	695

refer to Chart 5. There is an example where between the two hundred and eightieth and three hundred and tenth days of illness, the cholesterol values increased concurrently with the serum protein values. There is no doubt that there is often an inverse development of lipid and serum protein values, but just as frequently we have noted a concurrent increase or decrease which is not in accord with Fishberg's[7] theory. In 1928 Löwenthal[9] expressed the opinion that lipemic nephrosis is a primary disease of the fat metabolism followed secondarily by nephrotic changes in the kidney. We accidentally observed a sudden relapse in a latent nephrotic patient as well as a sudden cure in another. Were Löwenthal's hypothesis correct, the hyperlipemia should have developed prior to the sudden increase of the albuminuria in the first child, while the hyperlipemia should have decreased before the albuminuria subsided in the second patient. As one can see in Charts 1 and 5 this was not the case. In Chart 5 it is shown that the hyperlipemia developed simultaneously with the sudden increase of the albuminuria, whereas the total lipid and cholesterol values started to decrease (Chart 1) with, or even shortly after, the disappearance of the albuminuria in this patient. Thus, Löwenthal's theory cannot be confirmed by our clinical observations.

How then is the nephrotic hyperlipemia to be explained? That it is endogenous in origin is certain.[16-19] We gave a lipid free diet[20] to four children for a period of from two to four weeks, followed by a ketogenic diet for two weeks, varying the latter in ratios up to 3.5:1 in two patients without any influence on the blood lipid concentrations. Recent reports[21] show that lecithin reduces the lipemia in xanthomatosis. On this basis, for an interval of three weeks, we gave from 30 to 40 Gm. of soya bean lecithin to three of our nephrotic children per os without observing any influence upon the blood lipid concentrations.

In 1942 Heymann[10] advanced the hypothesis that the disease of the kidney itself might be responsible for the increase of the blood lipids found in nephrosis. This was based mainly on two experimental observations made in dogs. We found that (a) unilateral and bilateral nephrectomy, and (b) the parenteral administration of $HgCl_2$, potassium dichromate, and uranium nitrate gave rise to a hyperlipemia. This experimentally produced hyperlipemia like that found in nephrosis, involves total lipids, free and esterified cholesterol and phospholipids as well and is independent of changes in serum protein concentration.

It is not restricted to dogs; it has also been found in cats,[11] rats,[12] and monkeys.[13] Because the same results may be obtained after extensive tissue necrosis, or occasionally after sham operations, or splenectomies,[14] the kidneys are only one of several factors involved in a mechanism which regulates blood lipid concentration. If in lipemic nephrosis, however, none of the other factors are present which may give rise to an increase of the blood lipids, there is every reason to

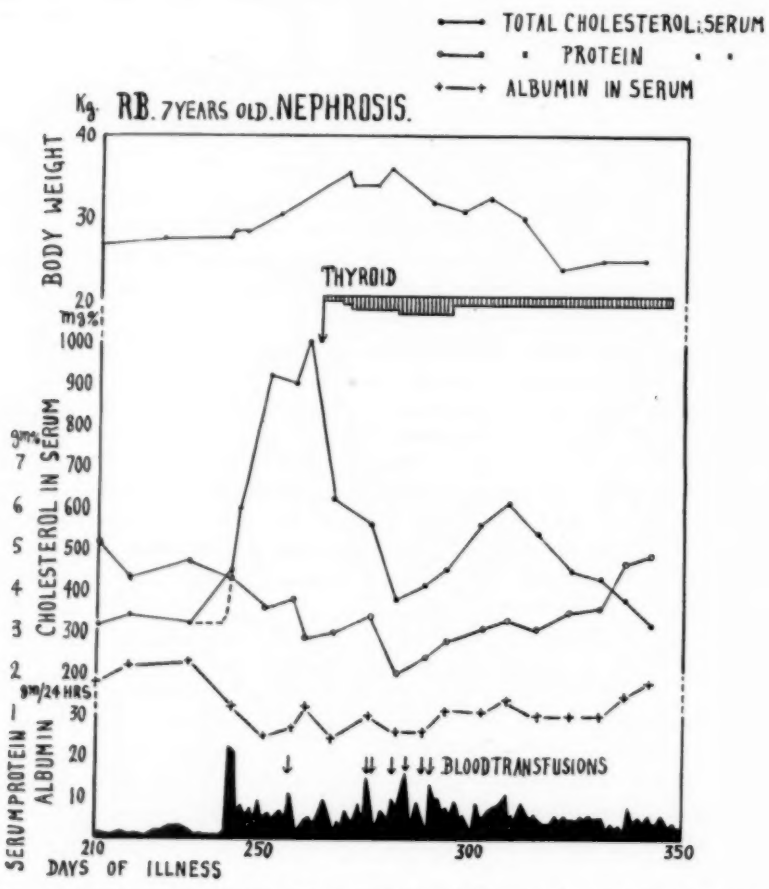

Chart 5.—Simultaneous development of hyperlipemia and albuminuria and influence of thyroid administration upon hyperlipemia and body weight (ascites and edema).

believe that the lipemia is of renal origin. This hypothesis is in agreement with the simultaneous development of albuminuria and hyperlipemia (Charts 1 and 5) and with the independent occurrence of hyperlipemia from hypoproteinemia (Charts 4 and 5). It is furthermore supported by the observation that in experimentally produced "nephrotoxic nephritis" in rats[15] marked hyperlipemia was found.

Although the *therapy* in lipemic nephrosis is far from being ideal, one should not have a pessimistic and passive attitude. We advocate the following regime which controls the disease in most instances.

We have tried a great number of recommended procedures which proved to be of no practical value: Amigen, 20 Gm. daily, given orally to four children for three weeks, parenamine, 70 to 90 c.c., given intravenously daily for two to three weeks, calcium chloride or calcium gluconate orally or intravenously in large doses; vitamins A, B, C, and D, including liver extract and liver mush. Recently we have also discontinued the use of diuretics. The only ones which might be of some benefit are urea and mercurial compounds. They have such disadvantages that they do not compensate for the small advantage gained by a twenty-four- to forty-eight-hour lasting diuresis. Mercurial diuretics, if used at all in nephrosis, should be given intramuscularly[22] only. We have seen two deaths following their intravenous use even in a 1:10 saline dilution. Because of the role which the pancreas might play in fat metabolism, two patients were given without benefit from 3 to 4 Gm. of pancreas extract* orally for three weeks. Finally on two different occasions we gave one child an intravenous infusion of 110 c.c. of reconvalescent plasma without success. This plasma had been obtained from a patient who had recovered from nephrosis for at least from three to four years. Because of the beneficial influence which febrile infections may occasionally have, we also have tried fever therapy in five instances for from ten to fourteen days without any success.

The administration of *thyroid extract* has had its place in the treatment of lipemic nephrosis ever since it was first recommended by Eppinger.[23] Its value has, however, not always remained unchallenged. We believe with many others[24] that in proper doses it will aid in eliminating the edema and in reducing the hyperlipemia. We have made it a rule to increase the dose by ½ to 1 grain every 10 days until toxic symptoms are observed. We then decrease the amount by ¼ to ½ grain and continue treatment with that subtoxic amount until the child is free of edema and the severity of the hypoproteinemia and the hyperlipemia has diminished for at least from two to three months. Hyperthermia, mild diarrhea, and tachycardia were the first toxic signs generally observed. During febrile infections thyroid medication is discontinued. We have treated ten patients according to this regime and have given as much as from 5 to 6 grains of thyroid extract to 3- to 4-year-old patients weighing from 15 to 20 kg. without observing any undesirable complications. It is understood that the progressive increase of the dose is not carried out to subtoxic amounts if the edema subsides before such symptoms have been produced. We are not in a position to say that thyroid medication alone will bring about the described result because we always gave it with some other form of treatment. We feel quite certain, however, that in eight of the ten patients so treated, loss in weight and decrease in the hyperlipemia were the results of thyroid medication. One example is shown in Chart 5.

Every nephrotic patient received a salt-poor *diet* with fluids limited to from 1,200 to 1,500 c.c. per twenty-four hours and containing 3 Gm. of protein

*Panteric tablets (Parke Davis & Company, Detroit, Mich.).

per kilograms body weight. We agree with Holt and Howland,[25] however, that the dietary treatment of nephrosis is of doubtful value.

If the edema and the ascites did not diminish within two weeks of bedrest, dietary treatment, and thyroid medication, we supported the outlined treatment with *daily intravenous infusions of from 2 to 250 c.c. of plasma* until the edema and the ascites were definitely decreasing. They were then given every second or third day until the edema had entirely disappeared. The plasma infusions combined with thyroid medication promptly eliminated the edema and the ascites in five and probably in two more of nine so-treated patients within two to six weeks. Consequently, we feel that the chance of actually relieving a nephrotic child of edema and ascites has been definitely improved. It takes a great amount of skill and endurance to find and to use the necessary veins* for daily infusions, but this treatment is without risk and of value in most instances. It has been pointed out previously that the reduction of edema and ascites may begin under the influence of plasma infusions before the plasma protein values begin to rise (Chart 4). Consequently the exact mechanism of this diuresis is not entirely clear.

Whenever the abdominal distention became too uncomfortable *abdominal paracentesis* was performed. The prophylactic administration of sulfonamides (0.1 Gm. per kilogram body weight) was started from one to two days previously. Using a 3- to 16-needle, from 1,500 to 3,000 c.c. of ascitic fluid have been removed within one to three hours. During the last three years this has been done over sixty times in eight different patients without any complication. The benefit is usually only temporary, the ascites reoccurring within from two to eight days. In one 2-year-old patient, however, we observed on two occasions that the withdrawal of abdominal fluid stimulated further recursion of the edema. In combination with sulfonamide prophylaxis we prefer this procedure to mercurial diuretics. The hazard is slight and the benefit greater if supported by daily intravenous infusions of plasma and thyroid administered in the proper dosage.

The greatest improvement in the therapy of lipemic nephrosis is the successful treatment of intercurrent infections with *sulfonamides or penicillin*. The presence of nephrosis does not represent a contraindication for the use of sulfonamides. With the great susceptibility of these patients to infections we used sulfathiazole and sulfadiazine within the last few years in practically every case without observing any unusual sensitivity to these drugs. If the dose was less than 0.2 Gm. per kilogram these sulfonamides were given without an alkali because of the desired restriction in salt intake. Once in one patient we observed an erythema nodosum-like rash associated with fever due to sulfathiazole. Later this same patient tolerated the same drug without any complications. We have used a full dose of 0.2 Gm. per kilogram body weight for short periods only and have continued treatment with 0.1 Gm. per kilogram often for several weeks, without renal complications. Lately we saw two patients who had pneumococcic peritonitis and who were successfully treated with penicillin and daily infusions of blood or plasma.

*The abdominal veins, often greatly distended, have been used frequently.

Within the last two years we have treated nine patients according to the described plan. We have achieved in all but one the elimination of edema and ascites with some improvement of their blood chemistry findings within two to six weeks. The symptomatic benefit is considerable, but the disease, of course, remains essentially uncured.

Internists are inclined to look upon a cured nephrotic patient as an extreme rarity. Pediatricians are more optimistic in that respect. Aldrich[2] speaks of a fifty-fifty chance and Kohn and Schwarz[26] found 25 per cent of their patients to have recovered completely, while Davison and Salinger[27] report a mortality rate of 30 per cent in their experience with twenty-six cases.

I believe that our results indicate that the *prognosis* of lipemic nephrosis is fairly good. Twelve patients were re-examined from one to seventeen years after their discharge from the hospital (Table III). Nine had been discharged more than three years before being re-examined. It can be seen that eight patients were found to be normal healthy individuals in whom no evidence of a persisting damage was found. In three additional patients our information rests upon written reports obtained from the mothers, which provided insufficient data indeed. From their reports it seems probable, however, that these three children have also been cured. Only one of these twelve patients had, twelve years after the onset, a severe renal disease with hypertension, fixed specific gravity, and renal retinopathy, the prognosis, therefore, being grave.

An interesting finding is that three out of eight children had after the original nephrotic disease orthostatic albuminuria five, six, and eight years later, respectively. Considering the rare occurrence of orthostatic albuminuria, we believe that this is more than an accidental observation. If orthostatic albuminuria is rather frequently observed in children who have recovered from nephrosis, it will be important to consider this fact when re-examining nephrotic patients. One patient (Schwarz and associates[26]) who had been free of albuminuria for three years and whose urine again contained albumin later on might have been given a very different prognosis if it could have been shown that the albuminuria was of orthostatic origin and did not represent an actual nephrotic relapse.

Remembering the unexpected lability of the albuminuria observed in two nephrotic children who acquired measles and in whom the massive albuminuria subsided and subsequently reappeared overnight, remembering also the sudden cures of nephrosis reported by others and observed by us in three instances, and considering finally the observation of orthostatic albuminuria as the only residual nephrotic disease in three children, one wonders about the nature of the mechanism which permits large protein molecules to permeate into an otherwise protein free fluid and which at the same time seems to be quite easily reversible. On the basis of these observations we have tried the orthostatic or kyphotic position in three children ill with lipemic nephrosis to note whether it would have any effect on the albuminuria. It could not be shown, however, that kyphosis diminishes or that a pronounced lordosis increases protein excretion in the urine.

TABLE III. RESULTS OF RE-EXAMINATIONS AFTER ONE TO SEVENTEEN YEARS

DATA ON FIRST ADMISSION					DATA OBTAINED ON RE-EXAMINATION																
											CHEMISTRY IN MG. PER 100 C.C. SERUM										
NAME	SEX	AGE IN YEARS	CLINICAL EVIDENCE OF ADDITIONAL NEPHRITIS	ALBUMINURIA AT TIME OF DISCHARGE	NO. OF YEARS AFTER DISCHARGE	AGE IN YEARS	URINE ALB.	URINE SED.	BLOOD PRESSURE	ADDIS COUNT	SEDIMENTATION* RATE	TOTAL LIPIDS	CHOLESTEROL	LECITHIN	N.P.N.	B.U.N.	CREATININE	UREA CLEARANCE	B.M.R.†	EYEGROUNDS	ORTHOSTATIC ALBUMINURIA	REMARKS
J. M.	M	5	–	–	9	14	–	–	190/70	Normal	6	484	150	215	34	15.4	1.2	Normal	+18	Negative	–	Cured
L. J.	F	2	–	+++	1½	3½	–	–	90/60		5	730	203	244	24		0.8			Negative	–	Cured
C. T.	M	3	+	–	2	5	occ.+	–	100/60	Normal	11	500	160	150	30	15			+12		–	
D. F.					3¼	6	–	–	100/50	W.B.C.	27	516	147	135	30		1.1	Normal	+18	Negative	–	Cured
S. H.	F	9	?	++	9½	19½	–	–	100/70	Normal		790	175	269	28		0.7			Negative	–	Cured
	F	9	?	++	11	19	–	–	100/70	Normal		480	100	394		7.5		Normal		Negative	–	Cured
F. K.	F	11	–	++	6½	18	–	–	112/60	Casts normal	Normal	455	150	215		12.4	1.3	Normal	–2	Negative	++ 0.27‡ 0.13‡	Cured
B. K.	F	1	–	–	5	6	–	–	100/70	Casts normal	5	560	199	316	30		1.0			Negative	++0.12‡	Cured
K. S.	M	2	+	++	8	10	–	–	120/90	Casts normal	6	700	270	250	32				–19	Negative	++	Cured
C. D.	M	5	?	+	1	6			Out of town. Mother wrote that child is "doing splendidly."													Probably cured
R. B.	M	7	+	+	1	8	+	–	110/50		10	Out of town. Mother reported that child is doing well.										Probably cured
A. L. M.	F	6	–	++	17	23	–	–	Out of town. Mother reported that patient is working hard, married, and has one healthy baby 2 years old.													Probably cured
E. M.	F	9	+	++	12	21	++	W.B.C. ++ R.B.C.+	190/40	W.B.C.	Incr.	548	195	205		25	1.8	Greatly reduced	+27	Retinopathy		Chronic nephritis

*Method of Westergren. First hour values.

†Grid standard per cent.

‡Gram per cent albumin in urine after twenty minutes orthostatic position.

Surveying our cases as to the prognosis of lipemic nephrosis we find ourselves in accord with Aldrich[2] who recommends that a rather optimistic attitude be taken toward the parents of these children. On the basis of our results we feel justified in prognosticating a better than fifty-fifty chance[2] for recovery.

Of the thirty-four patients we observed, ten (30 per cent) died from intercurrent infections in the acute phase of the nephrosis. Deducting these ten from the total number of children, and also the eleven who acquired the disease less than three years ago, there were twelve patients available for re-examination. Table III shows that only one of these children acquired a chronic nephritic renal disease in spite of the fact that from four to seven children showed signs of additional nephritis at some time during the course of the disease. It is, consequently, important to know that an episode of nephritis observed during the course of a primary lipemic nephrosis does not necessarily aggravate the ultimate prognosis. It is to be re-emphasized, however, that we have not included cases of primary nephritis which led to a secondary nephrotic syndrome. The ultimate prognosis in these instances might be much worse.

All in all we may conclude that the ultimate prognosis of genuine primary lipemic nephrosis is not so gloomy as is generally believed. The 30 per cent mortality rate which we have had in a series of cases observed during the last twelve years is not valid any more. Our series includes a majority of children who did not have the benefit of recent therapeutic achievements. These children were not treated with adequate doses of thyroid extract and daily infusions of plasma. The intercurrent infections which were the actual causes of death in ten of these patients would today have been successfully treated with sulfonamides or penicillin. The cause of death in lipemic nephrosis is either an intercurrent infection or terminal chronic nephritis. The latter is rare; occurring in our experience in approximately 8 per cent of the cases. The former accident previously was the fatal cause in the vast majority of the cases. Of eleven patients which we treated during the last three years with sulfonamides and penicillin only one died of toxic pneumonia following measles. We, therefore, could come close to the actual situation of today, by stating that the mortality rate has been reduced to between 15 and 20 per cent.

SUMMARY

1. Thirty-four children suffering from primary lipemic nephrosis have been observed within the last twelve years. At the onset, 64 per cent were under 3 years of age showing clearly the young child's predilection to the disease. Twenty-one per cent were from 4 to 7 years and 15 per cent from 9 to 11 years of age when the disease began. These figures demonstrate its decreasing incidence among older children and explain its rare occurrence in adults.

2. Lipemic nephrosis is rare in the Negro race.

3. Six post-mortem examinations are discussed. The microscopic examination in three showed no signs of inflammatory disease and azocarmine stains revealed normal, not thickened glomerular basement membranes. In the three remaining cases renal inflammatory disease was found in addition to definite nephrotic changes. The nephritis in these instances was classified as interstitial

and pyelonephritic in type. Only one of these showed slightly thickened basement membranes. Together with the clinical observations it is concluded that there is (1) a primary lipemic nephrosis, (2) a primary nephritis which develops secondarily the nephrotic syndrome, and (3) a primary lipemic nephrosis which develops secondarily nephritis. The inflammatory lesion in this latter instance is usually of the interstitial and pyelonephritic type.

4. The chronicity of the disease should not be included in the terminology. Three children are reported who were ill for only two, four, and twelve weeks. Two of these healed spontaneously whereas the third cure followed an overdose of thyroid extract.

5. In spite of severe intercurrent infections frequently observed in our cases we cannot state that they either improved or cured the nephrotic disease. Thus, it is not recommended to delay chemotherapy in intercurrent infections.

6. Mumps and pertussis occurred in four of our nephrotic children. A temporary aggravation was seen during the acute phase of these infections. One out of four children who acquired measles died from pneumonia, whereas two others became albumin-free for from four to eighteen days. They temporarily lost the edema and the ascites and there was a transient improvement in the blood chemistry. The fourth patient who had measles temporarily became worse. Even though it is admitted that measles may temporarily improve the condition of a lipemic nephrosis, the "rumor" that it cures nephrosis cannot be substantiated.

7. It has been shown that hypoproteinemia and hypoalbuminemia do not entirely explain the formation of edema in nephrosis. The hypoalbuminemia is only one of several factors involved in this mechanism.

8. The endogenous origin of the hyperlipemia of nephrosis is shown by the fact that it is not affected by diets of either low or high fat ratios, nor does the nephrotic hyperlipemia decrease when 30 to 40 Gm. of soya bean lecithin is given for four weeks.

9. Clinical data do not support the hypothesis that the hyperlipemia is due to the hypoproteinemia, nor do they agree with the conception that the nephrotic kidney damage is due to a primary disturbance of fat metabolism. It has been shown in animal experiments that the kidneys are involved in a mechanism which regulates blood lipid concentration. On the basis of these studies the hypothesis is advanced that the hyperlipemia in nephrosis is of renal origin.

10. As for therapy, we recommended a salt-free diet containing 3 Gm. of protein per kilogram body weight, and a fluid intake limited to 1,200 to 1,500 c.c. in combination with thyroid extract. This is increased every ten days by ½ grain. As soon as toxic symptoms are observed, the dose is reduced by ¼ to ½ grain and kept as a maintenance dose for two to three months. If after two weeks of bedrest, thyroid medication and dietary treatment, the edema and the ascites have not appreciably decreased, daily intravenous infusions of from 200 to 300 c.c. of plasma are given and continued for from three to six weeks if necessary. Under the prophylactic administration of 0.1 Gm. per kilogram body weight of sulfadiazine or sulfathiazole, abdominal paracentesis may be performed

without risk, if the abdominal distention is excessive. A 3- to 16-needle is recommended for this purpose and will avoid keloid scar formation so often observed after the use of trocars. Intercurrent infections are treated with 0.1 to 0.2 Gm. of sulfonamides per kilogram body weight or with penicillin if indicated.

11. Twelve children were re-examined up to seventeen years after their first discharge from the hospital. Only one of these had a severe chronic nephritis. Eight were positively and three probably cured. Three out of the eight completely re-examined patients had an orthostatic albuminuria five, six, and eight years, respectively, after the onset of the nephrosis.

12. The ultimate prognosis of primary lipemic nephrosis is better than is generally believed. The mortality rate of 30 per cent which we have had in our series of thirty-four patients is not valid today. Most of these patients were treated before the described therapeutic regime was instituted. According to our observations in eleven cases treated during the last three years the present mortality rate would be approximately between 15 and 20 per cent.

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THE INDUCTION OF VITAMIN C SUBNUTRITION

A Comparison of Intradermal Tests With Plasma Ascorbic Acid Levels

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SCURVY is rare, but vitamin C subnutrition is sufficiently common to warrant serious attention not only by students of nutrition but also by practicing physicians. In vitamin C subnutrition there are no clinical signs or symptoms of scurvy. The diagnosis can be made only by the history and laboratory findings. In the history one looks for the four frequent factors in the production of vitamin C subnutrition:

1. An inadequate dietary intake of vitamin C.
2. A faulty absorption as in diarrhea and persistent vomiting.
3. An increased demand because of an increased metabolism as in hyperthyroidism and prolonged febrile diseases.
4. An increased urinary excretion which washed out the ascorbic acid as in large intravenous infusions before and after operations.

The plasma ascorbic acid level is the most frequently used laboratory determination for vitamin C subnutrition. Interpretations of the levels differ with the various authorities. A level of less than 0.2 mg. per cent is thought by most to be well below the average. Levels of more than 0.3 mg. are difficult to interpret since they vary with so many factors.

We have reported[1] recently on an intradermal test which would qualitatively indicate vitamin C subnutrition states. The test is based on the intradermal injection of a dye which will be decolorized by vitamin C. Slow decolorization of the dye would indicate that the tissues have an insufficient amount of vitamin C. Rapid decolorization would indicate a sufficient amount. In our test enough of a N/300 solution of sodium 2,6-dichlorphenol indophenol is injected to raise an approximately 4 mm. wheal (Fig. 1). A skin test time (the length of time required for the dye to disappear) of fourteen minutes or more suggests a definite degree of tissue unsaturation, from ten to thirteen minutes is borderline, and less than nine minutes indicates a normal amount of vitamin C in the body tissues (Fig. 2).

Different laboratory tests give information on various aspects of the vitamin C nutritional state and will not always correlate. There has been a tendency to overestimate somewhat the value of the blood level of vitamin C in appraising nutritional status. It is an important aid but does not tell the entire story. Kruse[2] states "it should be clear that there is no necessarily high correlation between data derived by different methods on the same deficiency disease. They

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provide information on different aspects and states of the disorder. Unfortunately, this fact has not been appreciated. Rather, it has been thought that various methods applied to the same deficiency disease should yield similar data. On this basis it has become the practice to test the validity of a method by comparing its results with blood values. This procedure is entirely unsound. When it is remembered that blood values shift rapidly and may fluctuate intermittently, while tissue changes vary slowly, there should be no expectation of

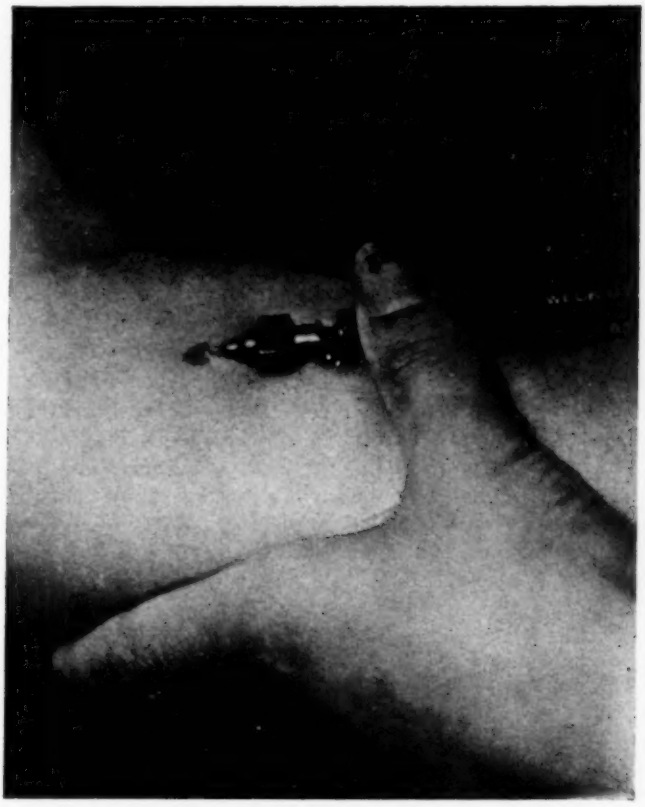

Fig. 1.—Technique of the intradermal test.

identical results. . . . Values on the concentration of a vitamin in the blood reflect very sensitively the recent dietary habit as well as other conditioning factors. They may change not only with season but also within shorter periods; they may fluctuate. . . . Potent therapy will produce maximum blood levels and entirely restore bodily saturation in several weeks, but will completely repair the slightest chronic tissue lesion only in months."

In 1940, human scurvy was induced by Lund and Crandon[3] in a gallant and classic experiment. On a vitamin C free diet, they found that the plasma

ascorbic acid level fell to zero in forty-two days. The ascorbic acid disappeared from the white blood cells in 122 days. In about five months, petechial hemorrhages appeared around the hair follicles of the legs. In the sixth month marked fatigability developed. Pijoan and Lozner[4] found similar results in six subjects placed on a diet lacking in vitamin C but normal in all other respects. Johnson and associates[5] had a group on a vitamin C deficient diet in whom the serum ascorbic acid was zero in all but one subject by the end of the fifth week, and in this case it became zero by the end of the seventh week. In 1939, Rietschel and Mensching[6] reported that one of them lived for 100 days on a vitamin C free diet. Before starting the diet, his blood level was 0.72 mg. per cent and at the end of 100 days was practically zero. During the entire experiment he felt as well as ever and recovered from a slight cold without any difficulty. They further asserted that the "danger zone only" begins after the blood level has reached the zero point. They point out that Widenbauer observed two infants who only developed scorbutic symptoms eight weeks after the blood level had been at the zero point.

PLAN OF STUDY

In our studies, we did not use an absolutely vitamin C free diet. We removed only citrus fruits and tomatoes from the diet. This approximated the ordinary living conditions of many of the children who have been seen in our clinics.

Sixteen children were kept under close observation in institutions. Their life approximated home environment as closely as possible. They attended school, played, exercised, and rested. The diet was adequate in all the essential elements of nutrition except vitamin C. The average daily diet was found to contain 2,150 calories of which 85 Gm. were protein, 237 Gm., carbohydrate, and 96 Gm., fat. The vitamin and mineral contents were equal to or above those recommended. It was very difficult to compute accurately the vitamin C content in this diet which contained no citrus fruits or tomatoes because of the effects of such things as cooking, standing, and mincing on the vitamin C content. There was probably at no time more than from 10 to 15 mg. of ascorbic acid in the diet per day.

Before being placed on the vitamin C deficient diet, the children were given from 50 to 300 mg. of ascorbic acid a day until the skin test time and blood were within normal limits. After the vitamin C deficient diet was started, plasma ascorbic acid determinations and intradermal tests were done at weekly intervals. When the plasma ascorbic acid went to approximately 0.2 mg. and the skin test was longer than fourteen minutes, ascorbic acid in various dosages were administered until the skin test and plasma ascorbic acid returned to normal.

RESULTS

Sixteen children ranging in ages from 5 to 11 years of age were given from 50 to 300 mg. of ascorbic acid daily until the skin test and plasma ascorbic acid levels were within normal range. This was usually accomplished in from one to three weeks. Then the diet which contained no citrus fruits or tomatoes

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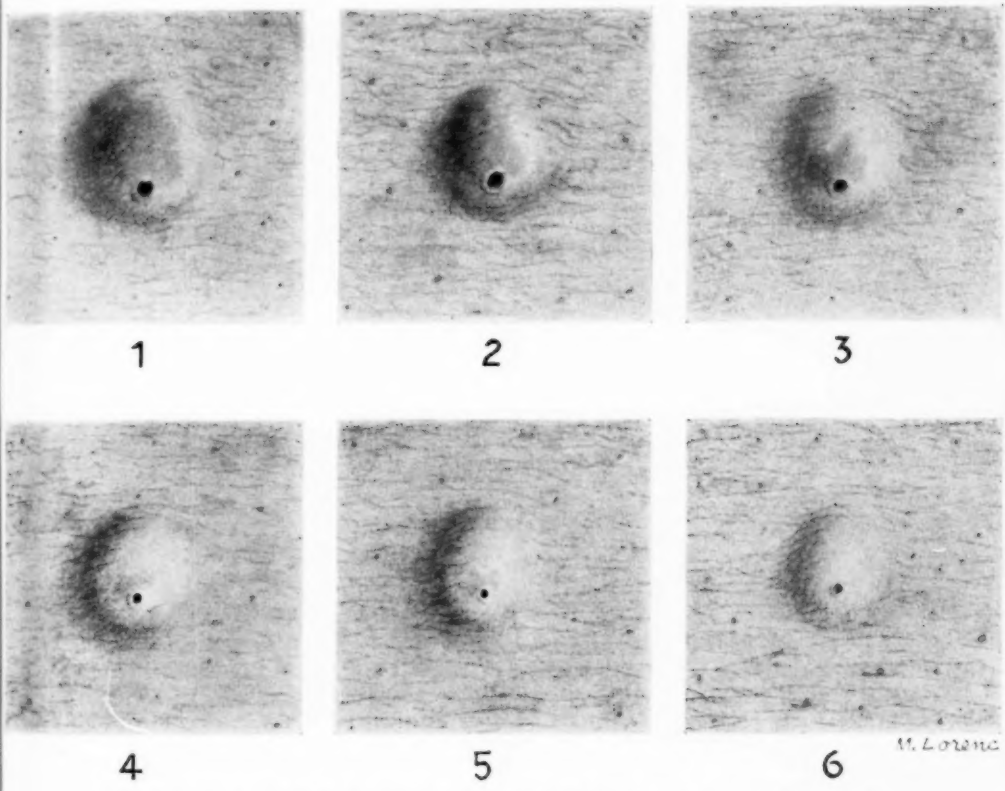

Fig. 2.—Intradermal test in patient with vitamin C subnutrition (painted from life).

1, Immediately after injection; *2*, 4 minutes after injection; *3*, 8 minutes after injection; *4*, 12 minutes after injection; *5*, 16 minutes after injection; and *6*, 17½ minutes after injection, disappearance of all blue color except the pin-point darker blue spot where the needle entered the skin. The pin-point darker blue spot is not to be considered in determining the decolorization time.

was begun. The results of the skin and blood tests before the diet, during the diet, and after administration of various amounts of ascorbic acid are given in Table I. Before beginning the diet, the skin test times were nine minutes or less in fourteen children and eleven minutes in two children. The blood ranged from approximately 0.5 mg. to 1.9 mg. During the diet, the skin test times became prolonged beyond fourteen minutes in all children. The skin test times were again shortened to normal following the administration of from 25 mg. to 200 mg. of ascorbic acid per day. During the diet most of the plasma levels of ascorbic acid fell. In Case 1, it took eight weeks for the level to reach zero. In Case 8, it required only two weeks to reach 0.11. In Case 14, the blood level was .98 mg. at the end of six weeks on the diet. In Cases 15 and 16, no blood tests were done. The blood levels rose following the administration of ascorbic acid.

The children felt well during the entire study and there were no abnormal physical findings. The blood counts and x-rays were essentially normal. In five cases the serum phosphatase was found to be within normal limits. Gross and some biomicroscopic examinations of the gums revealed some of the gingival manifestations of vitamin C deficiency described by Kruse,[7] however, no attempt was made at this time to evaluate and correlate these findings.

COMMENT

The entire significance of vitamin subnutrition is unknown at present. We cannot hold with those who believe that vitamin deficiencies should be treated only when they present actual clinical findings. It seems likely that vitamin subnutrition persisting over some time will produce biochemical changes that would mitigate against good tissue function. Also it is clear that clinical deficiency can easily follow vitamin subnutrition.

In our studies, we did not use an absolutely vitamin C free diet. It is important to note that subnutrition can be induced on a diet which lacks citrus fruits and tomatoes. It took eight weeks for the plasma ascorbic acid to fall to zero. This is two more weeks than it took in comparable studies on a diet completely free of vitamin C. We can postulate that it would take a much longer time for clinical signs and symptoms of vitamin C deficiency to appear with a mildly deficient diet than with a markedly deficient diet.

Individuals have different vitamin C requirements. On the same diet and under similar basal conditions, they will become deficient at different times. Vitamin C requirements are dependent not only on age, height, and weight, but also on a complex of factors—endocrine, nervous and others—which govern an individual's vitamin C metabolism. These factors we are attempting to evaluate in other studies. It is necessary, therefore, to individualize estimates for the vitamin C intake in prophylaxis and treatment of vitamin C deficiencies.

In our studies, both the plasma levels and the skin tests have followed the induction of vitamin C deficiency and the reversal with administration of ascorbic acid. It is argued that our skin test is only a qualitative test while the plasma level is more quantitative. From a practical standpoint, we have received just as much information from the skin test. Since the skin test is

TABLE I

NO. SEX	AGE (YR.) RACE	DAY DIET STARTED	WEEKS AFTER DIET STARTED 1	2	3	4	5	6	7	8	9	10	11	12	
1	7	7.5	9.3	8.9	9.1	8.1	12.0	15.5	16.5	16.8	15.2	15.7	9.8	9.4	Skin min.
m	w	1.47	.81	.46	.51	.53	.45	.30	.20	.00	.12	.34	.54	.55	Blood mg.
											25	25	25		A. A.* mg. therapy
2	8	5.2	16.3	15.4	10.6	12.3	17.4	17.8	17.1	9.6	9.2	8.3	5.9		Skin min.
f	N	.54	.55	.70	.30	.40	.42	.12	.23	.43	.44	.73	.74		Blood mg.
					25				25	25	25	25	50		A. A. mg. therapy
3	10	9.4	15.9	18.8	15.3	10.1	10.2	7.6	8.5	5.4					Skin min.
f	w	.50	.31	.36	.18	.65	.85	1.49	1.12	1.41					Blood mg.
						25	50	50	50	100					A. A. mg. therapy
4	8	11.2	21.8	17.1	18.6	19.4	12.8	10.1	7.9						Skin min.
f	1 N	.94	.36	.20	.21	.43	.33	.75	.98						Blood mg.
						25	25	50	100						A. A. mg. therapy
5	6	8.3	8.3	15.8	16.7	15.5	12.9	14.6	8.5						Skin min.
m	w	.46	.38	.19	.20	.21	.36	.18	.52						Blood mg.
									150						A. A. mg. therapy
6	8	11.0	17.0	19.0	16.0	15.2	13.8	16.7							Skin min.
f	w	.48	.52	.22	.23	.27	.20	.20							Blood mg.
7	8	7.0	16.9	16.4	18.0	7.7									Skin min.
m	1 N	.95	.32	.34	.11	1.47									Blood mg.
						50									A. A. mg. therapy
8	10	7.7	11.7	14.1	22.3	17.3	9.8								Skin min.
m	w	1.30	.32	.11	.11	.33	1.27								Blood mg.
						50	50								A. A. mg. therapy
9	6	7.0	9.1	12.2	24.2	21.9	19.1	10.7	8.5	7.8					Skin min.
f	w	1.84	1.02	.63	----	.36	.23	.40	2.29	.97					Blood mg.
								50	100	100					A. A. mg. therapy
10	7	7.2	14.5	14.8	15.6	12.7	7.2	5.8							Skin min.
f	N	1.15	1.14	.75	.24	.60	----	.97							Blood mg.
						50	100	100							A. A. mg. therapy
11	11	6.8	9.5	14.1	17.0	17.9	8.6	7.8							Skin min.
m	1 N	1.95	.62	.31	.22	.29	1.07	1.89							Blood mg.
							200	200							A. A. mg. therapy
12	8	6.4	7.7	8.1	7.4	17.4	14.4	14.1	12.2	9.9	6.6				Skin min.
f	w	1.77	.88	.57	.57	.49	.37	1.10	1.27	1.63	1.36				Blood mg.
								25	25	50	100				A. A. mg. therapy
13	10	6.6	12.8	16.5	16.9	14.4	10.8	6.1							Skin min.
f	w	.99	.51	.98	.88	.39	1.71	1.84							Blood mg.
							50	100							A. A. mg. therapy
14	5	6.8	10.7	10.8	12.4	15.0	14.3	14.8	5.7						Skin min.
m	w	1.00	1.26	1.08	----	.85	.76	.98	1.30						Blood mg.
									100						A. A. mg. therapy
15	6	9.5	16.5	15.0	14.8	15.2	9.5	9.0	11.7	4.0	3.8				Skin min.
m	N						25	25	50	50	100				A. A. mg. therapy
16	8	6.3	7.2	8.8	17.2	15.1	16.8	7.0	8.9	6.5					Skin min.
m	w							50	100	100					A. A. mg. therapy

*Ascorbic acid.

cheap, easy to perform and quickly read, it can be used frequently in following a case in practice. We have not done vitamin C concentrations in the white cell layer because that only falls late in the course of vitamin C deficiency.

SUMMARY AND CONCLUSIONS

1. Vitamin C subnutrition was induced in sixteen children by a diet which lacked citrus fruits and tomatoes.

2. The plasma ascorbic acid levels and intradermal test followed reliably the induction of vitamin C deficiency and returned to normal with administration of ascorbic acid.

3. The intradermal test is cheap, easy to perform, and quickly read.

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A VISION TEST FOR PEDIATRICIAN'S USE

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THE evaluation of vision is a desirable part of the periodic examination of children: the pediatrician should be prepared to screen out those of his patients who require the services of an eye specialist. At present this part of the pediatrician's examination is often omitted by him: his tendency has been to avoid it because it is considered to be a field requiring special equipment and training and because it is generally regarded as requiring too much of his time. However, in the work which we have done with vision testing programs it has been found that a fairly complete test can be given within a four-minute interval[1, 2, 3] and recently certain pediatricians have asked whether this test would be suitable for their use. It seems to us that pediatricians would find it practical for use in their offices, but to simplify this test further one part has been omitted and yet its efficiency only slightly impaired.

Many children at age 4, and almost all by age 5, can be tested in this manner; in the case of those who do not know their letters the illiterate symbol E chart (in which the child indicates the direction of the letters) should be used. The test is equally applicable to older children. The usual medical examination includes an inspection of the external eye, the eye movements, the pupils, and a search for the presence of inflammation or other gross pathology as well as the use of the ophthalmoscope. In this particular sphere we have no suggestions to make, but in regard to those subtle conditions which are capable of producing eye dysfunction and which are not uncovered by the usual eye inspection, the method of testing described herein will be found effective.

In general there are three conditions in the eye of normal appearance which can cause difficulty: (1) lowered *visual acuity;* (2) the presence of a *latent refractive error* (hypermetropia, "farsightedness") in which normal vision is maintained by an excessive compensatory effort capable of producing "eye strain"; (3) those *latent muscle imbalances* which are obscured by a strong compensatory effort to avoid diplopia and which also can be productive of "eye strain." In a group of 137 adolescent boys referred to an eye specialist,[4] 74 per cent fell into the first category, 20 per cent into the second, and 6 per cent into the third. An examination of 797 boys,[3] 35 per cent of whom already had glasses, showed that 22 per cent failed the visual acuity test without glasses, an additional 5 per cent failed the test for a latent refractive error (hypermetropia); and an additional 4 per cent failed the muscle imbalance test. The percentage of individuals falling into any of these categories depends in part on the number which have previously had a thorough eye examination: the

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figures given were for privileged preparatory-school boys, many of whom had previously had adequate attention. The inclusion of a test of latent hypermetropia is important: in a recent survey[3] it was found that about 7 per cent of the 518 boys who did not have glasses passed the visual acuity test but failed the latent hypermetropia test. Thus, while these individuals had 20/20 vision, there still remained a condition capable of producing symptoms. It should also be emphasized that the possibility that eye strain is present cannot be eliminated just because the patient is wearing glasses: eye strain cannot be excluded as the source of symptoms unless one is sure that all of the existing refractive errors have been corrected adequately.

I. *Lowered visual acuity* may be caused by (a) any degree of "near sightedness" (myopia), (b) high amounts of "far sightedness" (hypermetropia), and (c) moderate to high amounts of astigmatism. Myopia may cause a significant reduction in visual acuity but it rarely produces headache or "eye strain." On the other hand, high amounts of hypermetropia or moderate to high amounts of astigmatism will not only decrease the visual acuity but will also frequently give rise to such symptoms as headache, inability to concentrate, nausea, vertigo (not exaggerated by change in posture) and many vague as well as definite complaints of ocular asthenia generally referred to as "eye strain." Part one of the test to be described serves to screen out individuals having reduced visual acuity.

II. A significant refractive error *(hypermetropia, "far sightedness")* may be present and yet the patient can still have normal visual acuity. In such cases excessive exertion of one's accommodation corrects the refractive error. Hypermetropia is corrected by convex lenses. Since accommodation of the crystalline lens is in effect a source of supply of convex power (the curvature of the lens becoming more convex through the action of the ciliary muscle) the child learns early and subconsciously to correct his own hypermetropia so that he can have clear sight. However, the sustained excessive use of his accommodation may cause fatigue and other symptoms which the child will tolerate in order to maintain good vision. These resultant symptoms may be the same ones mentioned in the preceding paragraph. Very often the excessive use of accommodation may in turn upset the relationship which it normally has with the convergence action of the eyes. For this reason an ocular muscle imbalance (accommodative esophoria) may be introduced and it may further increase the effort necessary to maintain normal vision. As a result of this train of events the symptoms may become out of proportion to the underlying cause and their basis not be suspected because the sight is well within normal limits. Part two of the test is designed to screen out patients who have this condition. Its modus operandi is simple. Convex lenses of a predetermined power are placed before the eyes. If the patient has hypermetropia (which is correctible in part or whole by the convex lenses) he will "accept" them, i.e., he will be able to read the test letters through them. This is because his accommodation will relax its overexertion and will allow the lenses to supply the needed convex power. If, on the other hand, his error is less than the power of the test lenses, or if he has no hyperopic refractive error, he will be unable to read the test letters. A homely comparison may be drawn with

the type of paper napkin holder found in some restaurants. In these a concealed spring gives the impression of an adequately full holder whether there be only one or many napkins present. Similarly hypermetropia, because of its concealed spring (accommodation), yields normal visual acuity and gives the impression that the eyes are normal. In the case of the napkin holder a simple instrument to determine the need for more napkins ("help") would be a suitably sized block of wood. When this could be inserted in the napkin compartment (i.e. "accepted") it would indicate the need for more napkins ("help"). In a like manner the pair of convex lenses are used to test the need for "help" in the eye. If they are accepted (i.e., if the eye is able to read test letters through them) the eye needs help. Ability to read test letters through the lenses is, therefore, an indication for referral to an eye specialist, whereas failure to read the test letters through them represents a normal performance.

III. *Latent muscle imbalances* can also cause symptoms of ocular discomfort. The direction of the two eyes must be precisely coordinated if one is to have single vision, i.e., to make the two eyes act as one. The "fusion sense" is the name of that driving force which keeps the eyes in proper alignment. The ease of coordination of the two eyes may vary in different individuals by virtue of many factors including shape of the head, distance between the eyes, and others. Thus the "fusion sense" may have to work excessively under certain conditions in order to maintain single vision. This draining from the reservoir of fusion power may cause ocular symptoms varying in degree from eyes which tire easily to discomfort of considerable magnitude. Simple methods for detecting latent muscle imbalances have been described elsewhere.[1, 3]

The Massachusetts Vision Test[1] and its modification[3] were devised for the detection of all three of those defects. However, in order to offer an eye test which would be more practical for a pediatrician's office use, we have decided to omit that part having to do with muscle imbalance. This permits the elimination of the special light source, the use of certain special lenses, and of testing conditions such as darkening of the room. We appreciate that this represents a compromise, but we feel that only a small percentage of the total which would be referred to an eye specialist will be lost, and that this is much more desirable than suggesting a test whose extra equipment and conditions, although relatively simple, might restrict its use in everyday practice.

METHOD OF TESTING

The test is divided into two parts. Failure in the first part is sufficient for referral to an eye specialist and consequently removes the necessity for carrying out the subsequent procedures. This test can be effectively administered by an office assistant after only a short period of instruction. The entire test can be completed within a very few minutes.

Part I. Visual Acuity.—A clean letter chart* is hung whenever possible

*The following are among the charts which have been approved by the A. M. A.: American Optical Company—Distance Test Chart No. 1930 and illiterate E Chart No. 1942. Bausch and Lomb Company: Snellen Test Card No. 71-35-93; Illiterate E Test Card No. 71-35-98. (These cost less than 50 cents each.) Charts may be obtained from a medical supply house or from the American Medical Association.

exactly twenty feet from the patient,* and care should be taken to prevent the patient from examining the chart before his test begins. Illumination may be obtained from a 50-watt bulb in an office floor lamp or from a spotlight inserted in a ceiling socket.† Effort should be made to light up the chart evenly and without glare: for more standard illumination a number of commercial illuminators are available. The eye not being tested is covered by a small cardboard square, and care is taken not to put heavy pressure on the eye. Squinting is not allowed. The smallest line of letters which can be read is recorded for each eye.

Part II. Latent Refractive Error (Hypermetropia).—The spectacles containing the plus 1.50 spheres‡ are placed in position and the patient closes both eyes for a few seconds. The left eye is then covered with a card and he is requested to read the 20/20 line. This is repeated with the right eye covered. *Ability to read* the 20/20 line§ through the plus 1.50 spheres with either eye constitutes a failure and indicates that a sizable refractive error is present.

EVALUATION OF RESULTS

The following conditions are indications for referral to an eye specialist, but it should be remembered that the standards for normal visual acuity vary somewhat with the age of the child. It would be well for the individual pediatrician to discuss with the ophthalmologists in his locality what they consider proper standards for referral.

a. Vision of 20/30 or less in either eye, providing an eye specialist's examination has not been made within the previous twelve months.

b. Ability to read the 20/20 line§ with either eye through the plus 1.50 spheres.

c. Symptoms of eye strain, blurred vision, headache, and other conditions which persist and seem to the pediatrician to be significant.

d. Any significant abnormality noted at the inspection of the *external eye.*

Comment.—Not all children failing these tests will require treatment, but the ophthalmologist should be the one to make this decision. It is not advisable for the pediatrician to indicate to the parents the extent of the eye difficulty, but only to suggest that a further examination by an eye specialist is advisable. This test is a compromise screening device, but represents what present experience would suggest as a practical test. In the near future some very simple apparatus may be available to test for muscle balance. Many devices are on the market and available at present, but none seems completely satisfactory to us at this time: those who wish to use a relatively simple method are referred to our previous reports.[1, 2, 3]

*Where 20 feet is not available, 10 feet or 15 feet may be used, and the visual acuity scored by the formula: "distance from chart over size of letters read," e.g., 15/50. The number of feet at which each chart line should be read is given on the charts.

†Such as the General Electric "Mazda 150-Watt Projector Spot."

‡Obtainable from any optician on presenting this prescription: R O. U. + 1.50 sphere. Mount in zylonite spectacles, 40-22-6″ skull temples (for larger children) and 38-18-5″ skull temples (for smaller children).

§When 15 feet or 10 feet distance is used, ability to read the corresponding line through the plus 1.50 spheres constitutes a failure: e.g. the 10 foot line at 10 feet distance.

SUMMARY

A brief method for examining eyes which requires little time and only a small amount of inexpensive equipment and yet which is efficient in detecting those children, from about the age of 4 through adolescence, who have either diminished *visual acuity* or a *latent refractive error* (hypermetropia), has been described in detail. A supplementation of this test with tests of heterophoria is suggested for those who wish a more complete examination requiring more, but simple, equipment. The necessity for a careful administration of the test because of its brevity and simplicity should be kept in mind.

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ORAL PLASMA FEEDING

A Preliminary Report on Neonatal Feedings

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THE pediatric investigations that make up this report are based not only upon simple laboratory equipment, but also upon empirical knowledge. This should not surprise the reader, since pediatrics took form in pure empiricism, evolving slowly into a medical specialty, grounded on scientific fact.

The report is presented in the hope that it will be of sufficient interest to engage the attention of investigators in clinics possessing superior laboratory equipment together with a larger choice of subjects and clinical material.

Neonatal weight loss commands the attention of pediatricians, especially with respect to premature infants, and to full-term infants with subnormal weights. More baffling still to inquiry, is the failure of newborn infants to gain after the initial weight loss reaches a plateau.

In the studies of neonatal weight loss, combinations of crude or purified sugars in acid, alkaline, or neutral media were used for prenatal feeding depending on the nature of the experiment itself. Additions of various physiologic salts and proteins were made occasionally to these formulas.

The results of these first experiments were not impressive, as they proved difficult to interpret. It was noted, however, that protein feedings occasionally produced the best weight gains.

Of special interest in this connection was the study by Sanford[1] in 1930, involving 4,622 infants, in a thorough investigation of various complemental feedings used during the neonatal period.

O'Donnel[2] similarly fed over 1,200 newborn infants with seventeen recognized neonatal formula mixtures. He concluded that it matters little which formula is given, provided it is carefully controlled, and he confirmed at the same time the results of Schorer and Laffoon that hydrating solutions were more conducive to extended breast feeding. O'Donnel noted, however, that those infants to whom he fed the Kugelmass mixture showed an advantage in neonatal weight gain.

Goldman,[3] after feeding 102 infants a high protein, low fat, low carbohydrate mixture during the first ten postnatal days, substantiated the opinions of Zahorsky,[4] Brenneman,[5] and Marriot and Jeans[6] that artificially fed infants thrived better on milk formulas high in protein than on standard nursery feedings.

These results, as well as mine, pointed to the value of incorporating proteins in some form or other, in neonatal and complemental feedings, as the best feeding to remedy neonatal weight loss. Further experimental neonatal feedings were obviously unnecessary, but I found at this point of my observations, a pertinent article by DeMarsh.[7]

From the Departments of Medicine and Cardiography of the Good Samaritan Hospital.

He pleaded both for the salvaging of all available placental blood as the best possible start for the newborn, and for the delayed clamping of the umbilical cord. In the same article he quoted Schiff[8] in finding: ". . . an increased excretion of nitrogen in infants, whose cords were cut early; and concluding that the placental blood acted as a source of nourishment protecting infants against the breakdown of body protein. . ."

This opinion led me to study the physical changes occurring in the cord after delivery, since it has often been observed that premature infants and infants delivered with collapsed cords, or following prolonged labors, show relatively greater neonatal weight loss and hold the initial weight loss plateau longer.

Approaching the problem from this direction, I now placed an infant, as soon as possible after delivery, on a level with the maternal buttocks. I then made a scissor-cut into an umbilical vein of the infant, and inserted therein, a self-retaining cannula.* This venous cannula was connected to a water manometer† and the subsequent manometric readings were recorded.

The readings obtained for a number of cases showed that when the cord pressure was high, the initial weight loss was less. The procedure as a whole was so complicated by little known variables in the maternal structures, in the infant, and in the placental blood as a colloidal medium that it was abandoned.

It indicated, nevertheless, that a continuous transfusion of plasma solution, via the cord, was possible for a short period of time, at least; and that the method might be of value in sustaining the newborn infant, especially the premature infant, over a most hazardous period of his adjustment.

This method was adopted as occasion arose, and, while practicable, its supervision entailed some difficulty that grew proportionately with the prematurity of the infant.

The results were of value in a few cases; at least there were no deaths.

About this time Noon[9] read a paper in which he compared various complementary feedings during the first two weeks of life of the newborn infant. The formulas discussed constituted the pediatrician's armamentarium with a few exceptions.

Noon through photographic slides showed comparisons in the following respects: the initial weight loss, the plateau, and the gradual return to birth weight. These points, familiar to pediatricians, led Burkett[9] to reaffirm the belief that: ". . . The initial weight loss of the newborn is a natural phenomenon which closely coincides with the duration of the flow of colostrum. . ."

Before describing the following intensive study of the events subsequent to delivery of some infants, allow me to raise a question. Why does Nature provide as early as the fourth month of pregnancy, a substance called *colostrum*, marvellously adapted, in any eventuality, to all critical needs of the coming newborn infant, yet offered to it for a period of only forty-eight hours after delivery?

*Beckton-Dickson: Special Needle G-18 483LNR.
†Beckton-Dickson: Direct Venous Pressure Apparatus.

To put it another way, let us say that Nature provides highly specialized colostrum, at the earliest possible time to meet the exigencies of extra-uterine life. She cherishes and conserves it, so to speak, while holding in abeyance for a period of forty-eight hours after delivery the lactogenic forces of parturition, which in other mammals are concomitant with parturition.

It would appear, therefore, that human milk is not Nature's first food substance of predilection for the human newborn infant, for as we have seen, the human breasts provide first and foremost, colostrum. In this respect, woman differs radically from all other mammals, who invariably possess milk in their mammary glands in the first few hours of delivery, or even during the process of labor.

A striking fact stands out in this connection. The closest available substance corresponding to colostrum is human plasma, provided the fat content be removed. To quote available literature further on the subject is disappointing for the reason that studies on the subject of colostrum are in need of revision. The libraries offer little material beyond the recopied statements of textbooks regarding its physical properties.

Medical authorities agree on one point, namely, that the fat of the colostrum is not desirable, and in some instances, baneful.[10] Three additional facts stand out from existing literature on the subject: (1) Colostrum, although containing fatlike globules, nevertheless resembles plasma more closely than human milk.[11] (2) Plasma is a transudate. (3) The intestinal wall within the newborn infant is readily permeable to protein, and to allied substances, the permeability decreasing in direct proportion to the maturity of the infant.[12-16]

As regards current medical literature on the subject of the absorption of colostrum, there seemed an utter absence of it in the libraries within reach. The closest approach to it, to which attention is called, is an excellent work, by Höber,[17] who described some important researches of a colleague, von Möllendorf[18, 19] of Kiel, in Germany.

Von Möllendorf[18-19] found that in newborn mice, trypan blue which normally passes body membranes very slowly (probably through phagocytes), and casein (which normally must be digested, before it can be absorbed), penetrated the intestinal epithelium quite rapidly, and that both substances promptly appeared on the other side of the epithelium after being put into the intestine.

This unique diffusion coincided with the absence of intestinal juice. When the juice appeared, the mature type of permeability was established.

These experiments and their noted results, unrelated as they are to oral plasma feeding, nevertheless led me to conclude that no harm could possibly arise from substituting plasma for colostrum.

With this in mind, seven premature infants were fed *orally* with a plasma solution in place of any other nutrient substance, adding after twenty-four hours of this feeding, plasma to the variously constituted neonatal feedings. The object was to reduce the limitations set by employing merely one or two types of neonatal feedings.

In all cases neonatal weight loss ceased, and the infants thrived. All moreover showed appreciable weight losses when the plasma was subtracted from the feedings (Chart 1). These changes were more conspicuous than those observed in other types of neonatal feedings of high protein content.

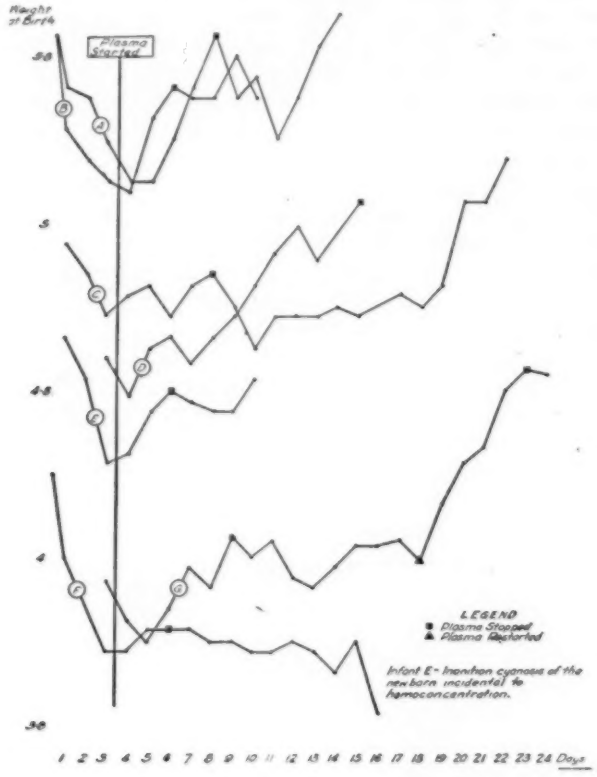
Weight at Birth
Plasma Started
LEGEND
Plasma Stopped
Plasma Restarted
Infant E - Insertion cyanosis of the newborn incidental to hemoconcentration.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Days

Chart 1.

While these experiments were being performed on individual premature infants, the possibility of coincidence, accidental or otherwise, arose to challenge the interpretation of results and the entire investigation was imperiled by this question, when fortunately a set of identical 8-month, premature female twins became available for study.

Case 1.—The first of the twins, Infant A (Chart 2), subjected to the traumas of birth, was fed plasma solution orally. The second, Infant B (Chart 2), delivered easily as a vertex, was fed only honey-water solution, according to the directions of Schlutz and Knott.[20]

Infant B exhibited, within twenty-four hours, the picture of a moribund premature infant, so well-described by Curtin[21] as *shock*. I prefer in this

connection, however, the definition, "Inanition cyanosis of the newborn incidental to hemoconcentration."

In spite of constant inhalation-oxygen therapy, the infant remained cyanotic for sixteen hours.

At this point the method of feeding was reversed; Infant B receiving plasma orally, while Infant A received only honey-water. Within one hour,

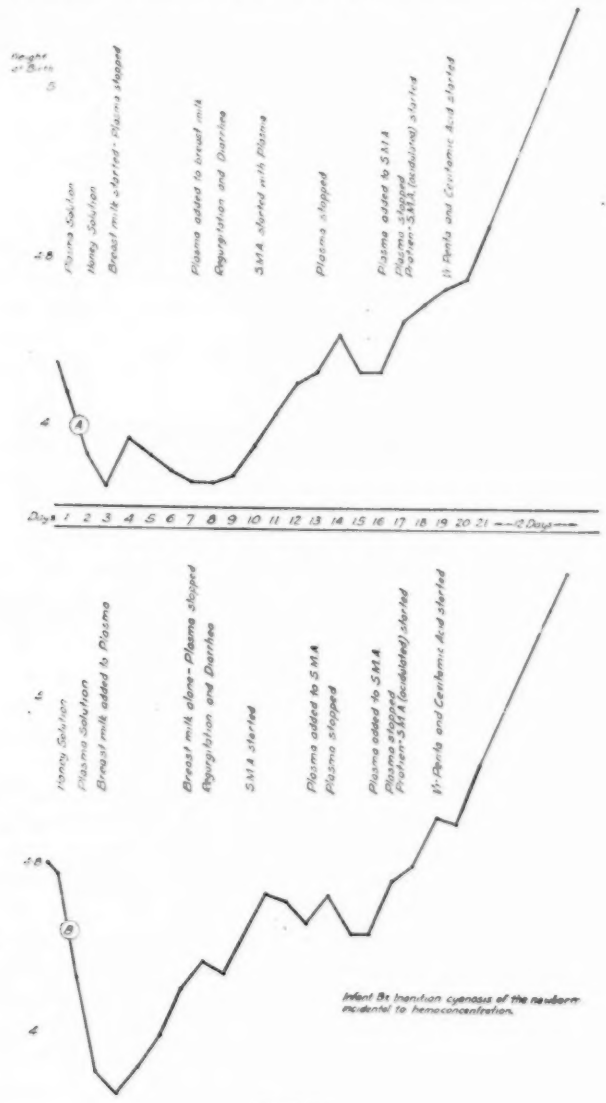

Chart 2.

Infant B became less cyanotic and more active. She cried feebly, and made a genuine attempt to nurse from the nipple; respirations became slower and deeper, permitting, within four hours, the oxygen to be discontinued permanently.

Curtin[21] comments on the startling results in marantic infants when plasma was administered intraperitoneally. Plasma was continued until the mother was able to produce breast milk. This was obtained through a breast pump,* both breasts being emptied simultaneously through a Y tube connecting bilateral nipple cups, an improved and timesaving device, producing the best possible yield with the least waste.

Infant B was fed breast milk and plasma: Infant A, breast milk alone. Infant B, in spite of her precarious condition on the previous day, showed the advantage immediately.

The mother's milk supply failing at this time, milk from a second mother was obtained. This mother had eaten heavily of fish two hours previous to the pumping of the breasts. Both infants responded with regurgitation and diarrhea. Vomiting was seldom observed during plasma feeding, but in spite of its occurrence here, the fact remains that Infant A, fed on plasma and borrowed breast milk, thrived better than Infant B, fed on borrowed breast milk alone.

The infants were then fed S. M. A.† as follows: Infant A was fed an S. M. A.-plasma mixture, while Infant B was fed S. M. A. alone. Infant A continued to gain weight, while Infant B lost weight. The feeding formulas were then reversed, with the results obtained shown on Chart 2.

Because of a shortage of plasma at this time, the infants were placed on protein-S. M. A. (acidulated) alone, and having reached birth weight, their feedings were augmented with vitamins A, B, C, and D, all purposely omitted up to this time. Results subsequent to the feedings are shown in detail on Chart 2.

Case 2.—Altering the procedure somewhat, it was applied to a set of identical male twins as follows: Infant A was fed plasma in honey solution. Infant B was fed honey solution alone.

On the following afternoon both infants were started on breast milk, but to Infant A's feeding, *plasma* was added. The breast milk supply becoming deficient on the next day, S. M. A. feedings were substituted for three feedings, with plasma added to Infant A's feedings; breast milk thereafter was fed to both infants.

Infant A, accordingly, on each successive feeding received plasma-breast milk, while Infant B received breast milk alone. Chart 3, shows the result. Particular attention is called to the fact that Infant A, the first-born of the twins, who was subjected to the traumas of labor, and who weighed less than Infant B, received plasma, gaining as a result, 8¼ ounces over birth weight.

*Dr. Abt Improved Electric Breast Pump, Bodine Electric Company, Chicago, Ill.
†S. M. A. Corporation, Cleveland, Ohio.

The initial weight loss of the plasma-fed Infant A, moreover, was only 2 ounces over a twenty-four-hour period; whereas the initial weight loss of Infant B, who received no plasma was 5¾ ounces over a ninety-six-hour period.

Infant A, fed on plasma, recovered his birth weight in two days, while Infant B, who received no plasma, required eleven days to regain birth weight. Or more clearly, infant A, who was fed plasma and breast milk, gained 8¼ ounces, while Infant B, who was fed breast milk alone, gained but 2½ ounces over the thirteen-day feeding experiment.

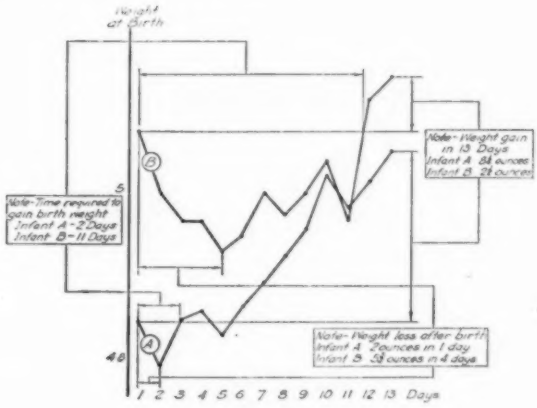
Weight at Birth
Note- Weight gain in 13 Days Infant A 8¼ ounces Infant B 2½ ounces
Note- Time required to gain birth weight Infant A - 2 Days Infant B - 11 Days
Note- Weight loss after birth Infant A 2 ounces in 1 day Infant B 5¾ ounces in 4 days
1 2 3 4 5 6 7 8 9 10 11 12 13 Days

Chart 3.

Case 3.—More recently I investigated the feeding of a set of twins, who failed consistently to gain weight over a period of twelve days. These twins were the heterogeneous type. The mother suffered a serious post-partum hemorrhage that precluded the feeding of breast milk directly or indirectly, in consequence of which the infants were fed a cow's milk and dextrimaltose mixture.

At my suggestion, this mixture was altered to an evaporated milk and dextrimaltose formula, in the hope that the increase in caloric feeding would prove beneficial, but the weight gains remained slight until plasma was added.

Chart 4 shows the result of plasma feeding, twelve days after the respective infant body weights had remained stationary. In this case, note that the amount of evaporated milk fed *per diem* during the plasma feeding was purposely reduced.

In spite of the reduced milk feeding, Infant A gained 8¾ ounces during the first four days of plasma feeding in contrast to losing 3½ ounces during the preceding twelve days. In much the same way, Infant B gained 9 ounces during the four-day plasma feeding, and only 5 ounces during the preceding twelve days.

A striking fact recorded at this point, was that in every feeding experiment carried out on the infants, the addition of plasma to the various formulas

described eliminated vomiting; and that the omission of plasma, on the other hand, predisposed to vomiting. The entry for the last day on Chart 4 and Case 7, further illustrates this condition.

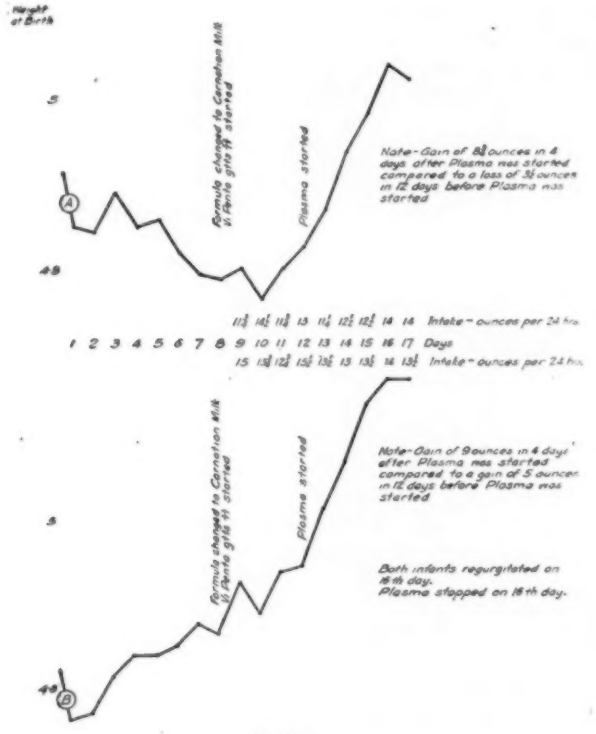
Weight at Birth
5
A
4 8
Formula changed to Carnation Milk 1/2 Porto grits #1 started
Plasma started
Note-Gain of 8¾ ounces in 4 days after Plasma was started compared to a loss of 3½ ounces in 12 days before Plasma was started
11¾ 10½ 11¾ 13 11¼ 12½ 12½ 14 14 Intake - ounces per 24 hrs.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 Days
15 13¾ 12¾ 15½ 13½ 13 13½ 14 13½ Intake - ounces per 24 hrs.
Formula changed to Carnation Milk 1/2 Porto grits #1 started
Plasma started
Note-Gain of 9 ounces in 4 days after Plasma was started compared to a gain of 5 ounces in 12 days before Plasma was started
Both infants regurgitated on 16th day. Plasma stopped on 18th day.
5
4 8
B

Chart 4.

Case 4.—(An 8-month premature girl.) The mother was placed in the charge of a colleague of mine about the time of her sixth month of pregnancy. She had gained 15 pounds in the preceding two weeks, became edematous, and suffered with severe headache and dizziness.

Her clinical laboratory report at the time showed: blood pressure, 180-100-90; specific gravity of urine, 1020; albumin in urine, 4 plus.

In spite of careful regulation under excellent medical and nursing supervision the condition worsened until the day of her eighth month of pregnancy, at which time immediate hospitalization was advised.

Almost upon admission, the woman fell into spontaneous labor, and was subsequently easily delivered, after episiotomy, with low forceps.

The infant was fed plasma with breast milk, at first borrowed, for a period of a week, at the expiration of which time, she appeared capable and

vigorous enough to nurse at the breasts of the mother. The infant failed to gain weight, while the breasts of the mother grew flabby and unproductive.

An S. M. A. mixture was fed to the infant and apparently was well tolerated, but again the weight gain was slight until plasma was added (Chart 5).

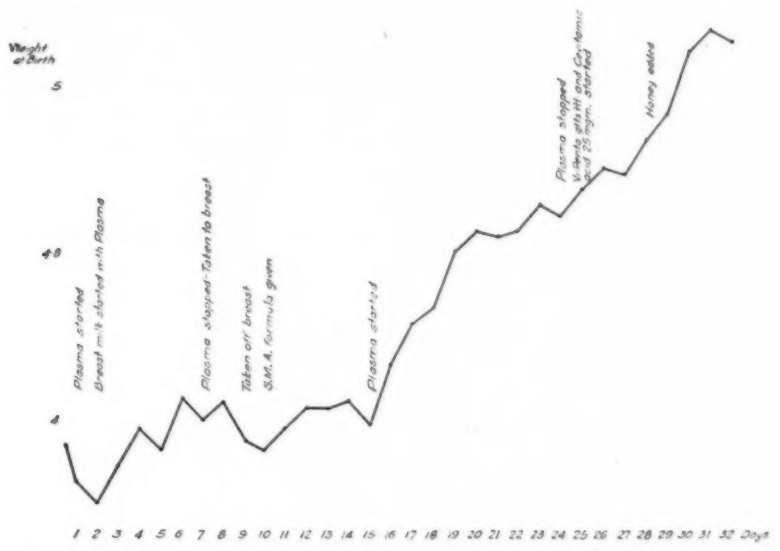
Weight at Birth
5
4½
4
Plasma started
Breast milk started with Plasma
Plasma stopped-Taken to breast
Taken off breast
S.M.A. formula given
Plasma started
Plasma stopped
Vi-daylin gtts III and Cytamen gtts 25 mgm. started
Honey added
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 Days

Chart 5.

Up to this time I had dealt with premature infants; with but little effort to determine and standardize the amount of plasma obviously essential to sustain life in premature infants. Throughout the course of the initial experiments, plasma was sparingly and even meticulously administered. With plasma more freely given, however, neonatal weight loss became almost negligible.

In the opening paragraphs attention was called to the studies of prominent pediatricians, repeatedly demonstrating that neonatal weight loss, especially in premature infants, could not ordinarily be averted. I felt, however, that if in spite of all evidence to the contrary I could prevent neonatal weight loss by the use of plasma, this baffling problem would be solved.

Using as a basis the absence of neonatal weight loss, the absence of gastrointestinal intolerance, and the general behavior of the newborn premature infant as indicators, I found on these premises that 10 c.c. per kilogram, administered every two hours, was approximately sufficient for all cases under investigation.

If the weight gain remained stationary or increased after the first twenty-four hours, the feedings were given every two and one-half hours. After forty-eight hours, the feedings were given every three hours.

Milk feedings were withheld for forty-eight hours, the plasma being administered during this interim in equal amounts of hydrated solution, my own preference being a honey solution.[20]

Chart 5A shows a typical premature infant (Case *A*) contrasted with two casually selected hospital premature infants (*B* and *C*), not fed with plasma. Premature Infant *A* behaved much like any full-term infant. The cry was lusty, movements vigorous and coordinated, color rose-pink, and skin turgor healthy and supple.

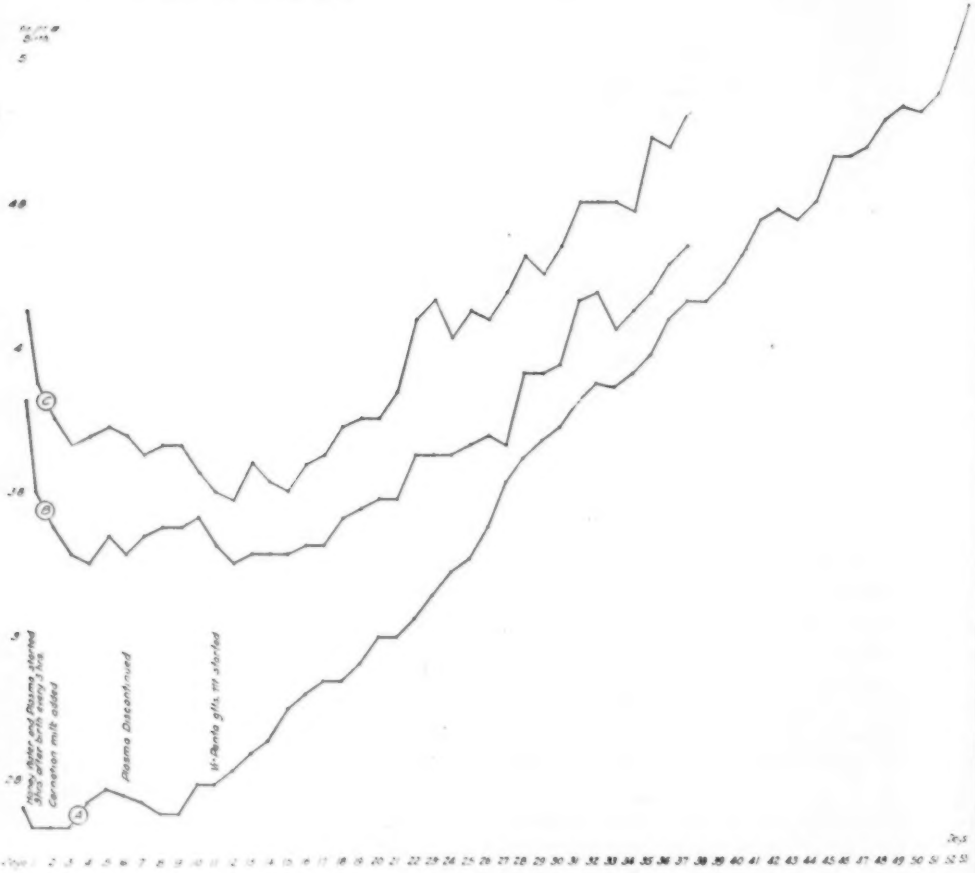

Chart 5A.

The doubtful "forced feeding" method of many present-day specialists, was in this case never attempted. It was observed, at the same time, that incubator life of the first ninety-six hours was entirely normal; and that it was subsequently transferred to an overcrowded nursery along with other full-term infants, to be treated as such.

It occurred to me at this point that the results of these investigations, however meager, performed on essentially normal premature infants, might be applied to certain abnormal infants encountered in pediatric practice.

Case 5.—The first of these encountered was a full-term infant, delivered after active labor for thirty hours of a primipara with a representative typical male pelvis.

The infant was in the R.O.P. position, the head abnormally flexed and molded. Upon delivery with low forceps after episiotomy, the infant refused to breathe. The umbilical cord was collapsed and pulseless. Heart sounds were feebly heard, the rate being only 30 to 40 per minute.

Conventional means, including oxygen therapy by resuscitator, were taken to revive the infant. Alpha-lobelin (1 ampule), with epinephrine (2 minims), was administered, since collapse seemed imminent.

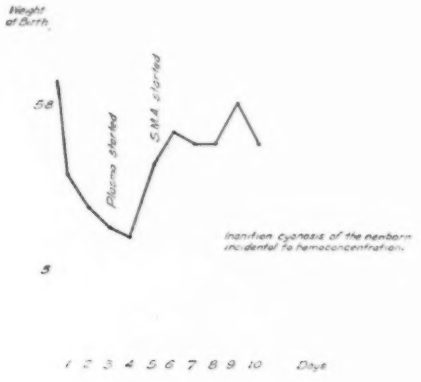
Weight at Birth
5.8
Plasma started
S.M.A. started
Transition cyanosis of the newborn incidental to hemoconcentration
3
1 2 3 4 5 6 7 8 9 10 Days

Chart 6.

After thirty-six hours of effort, including almost constant therapy of oxygen inhalation, the infant showed little improvement; in fact, the infant suffered generalized rigidity with a temperature of 100° F. and became, in addition, dehydrated, and acidotic, refused all feeding, and regurgitated even gavage feedings.

In this critical condition, plasma was administered orally to the infant and retained. Within an hour a profound change was observed. The infant's respirations decreased in number and improved in depth. The cyanosis disappeared, with the need for further oxygenation rendered unnecessary. The rigidity likewise disappeared, regurgitation ceased, and the temperature receded to 98.4° F. as the day passed. The infant, moreover, slept soundly between feedings.

Curtin[21] noted a similar effect when he treated infants intraperitoneally with plasma. Twenty-four hours later, the child under observation breathed normally, cried vigorously, and seemed hungry; in fact, the child appeared as a healthy newborn infant, with the exception of the stigmas of molding.

In this case, the plasma supply failed, and feeding with S. M. A. alone, was started (Chart 6).

Case 6.—My attention was now directed to a first-born male infant, nearly 2 months old. His birth weight was 6 pounds, 4 ounces, falling after ten days to 5 pounds, 13 ounces. While in the hospital he made feeble attempts to nurse at the breast, and was in consequence offered an evaporated milk-Karo formula, tolerating it well, and gaining in weight.

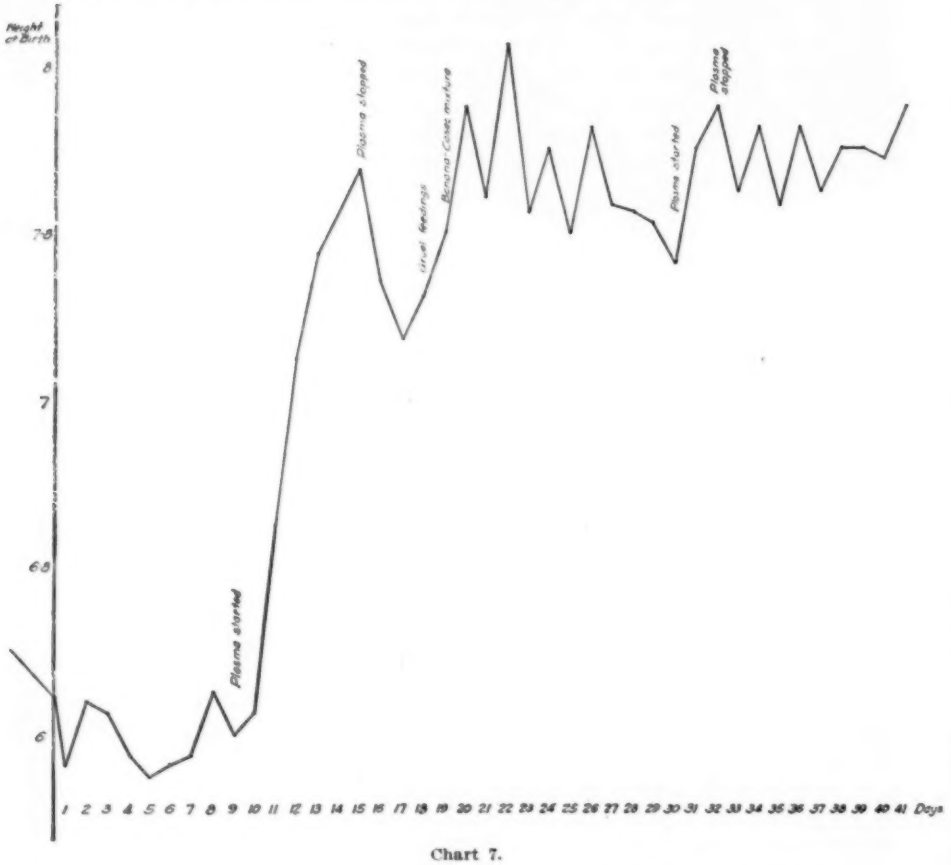
Weight at Birth
8
7½
7
6½
6
Plasma started
Plasma stopped
Usual feedings
Borden's Casec mixture
Plasma started
Plasma stopped
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 Days

Chart 7.

Upon discharge from the hospital, however, the infant failed to retain for any length of time, any of several kinds of feedings. Revisions were made in the various mixtures over a period of six weeks at the child's home. The parents, however, being none too intelligent nor cooperative, the infant was returned to the hospital where better supervision was afforded.

Upon the infant's readmission, at which time I was first consulted, although his age was nearly 2 months, his weight was only 6 pounds, 1¾ ounces.

A tentative diagnosis was made of an atypical pyloric stenosis. Belladonna-phenobarbital treatment was instituted without results.

With the feeding of plasma orally to this infant, the weight gain was remarkable (Chart 7); when the plasma feeding was interrupted, the infant lost weight but regained it upon resumption of the plasma feeding. Gruel feedings were attempted with some success, but at this point, the none-too-intelligent father signed the infant's release.

The infant was subsequently readmitted to the hospital and operated upon, according to the Ramstedt method, and at which time, a pyloric stenosis, which resulted in a nearly complete atresia was corrected.

Case 7.—Another male infant, of Jewish parents, was of subnormal weight and, in spite of careful adjustment of an evaporated milk formula, continued to lose weight steadily. With the approach of the eighth day for circumcision, the attending physician feared the rite to be detrimental to the infant's physical condition.

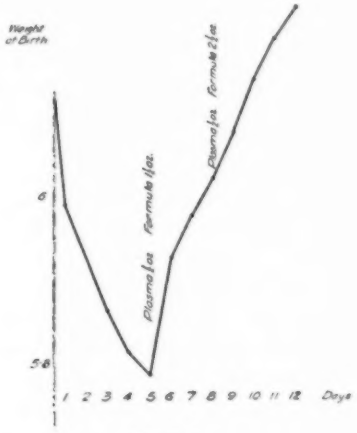

Chart 8.

Following a consultation on the case, he was placed on an evaporated milk formula, unchanged except for the addition of plasma. Upon the first feeding of the plasma addition, the infant, who had vomited consistently for five days, ceased to vomit without relapse.

The entire picture of the infant's condition was redrawn within the ensuing twenty-four hours, with the body color changing from a waxy pallor to a ruddy pink and with respirations deeper and slower.

In the next twenty-four-hour cycle, the infant exhibited even more improvement, by becoming hungry, sleeping between feedings, and gaining steadily in weight.

The rite of circumcision finally was performed, without harmful effect to the child and without subsequent loss of weight.

Chart 8 further describes the subsequent history of this case.

SUMMARY

1. Human plasma has been successfully administered by mouth to premature and neonatal infants with satisfactory results. So far as is known from available literature this is the first time plasma has been administered orally.

2. Reduced vomiting would indicate the absence of gastric irritation in this kind of feeding. It is not unlikely that plasma may act as a natural antacid in such feeding to reduce vomiting (Case 7).[22]

3. Intestinal disturbance was likewise absent if the plasma when fed to infants was free of red cells and of suspicious antigens.

4. The fact that Nature's first nutrient substance is comparable in many respects to orally fed plasma solution, provided recognized and undesirable elements are absent, largely removes any natural and scientific disagreement from the idea of high protein neonatal feedings.

5. It is possible that hormones, such as estrogenic substances, vitamins, and immune material, could prove an added benefit to the newborn infant in this type of feeding.

6. It remains a problem for further intensive study to show whether human plasma could be replaced in this form of "intestinal transfusion" by a synthetic protein-salt-carbohydrate mixture, in which the protein substance is not of human origin.

7. The use of autogenic protein may be more beneficial to the newborn infant, whose capacity for antibody production is much smaller than in later periods of life.

8. Weight gain is not necessarily to be associated with the complex picture of plasma protein digestion, but rather with the ready absorption of plasma protein, a fact borne out by the single case (Case 6) in which an operation removed a pathologic obstruction.

The cyanotic syndrome encountered in premature and neonatal infants, and which here *faute de mieux*, I call "the inanition cyanosis of the newborn incidental to hemoconcentration" has been successfully treated on three different occasions by the oral administration of plasma.

CONCLUSIONS

In the light of the foregoing investigations, and in the continued success of neonatal, oral administration of human plasma, I am convinced that whatever type of neonatal feeding we shall adopt eventually, it will be higher in protein than are the customary neonatal feedings of today.

This protein feeding, moreover, will be derived from plasma, to be substituted by synthetic proteins only, should human plasma be, at the time in question, unavailable.

It may well be that such synthetic proteins will prove inferior by reason of the absence of valuable and cryptic substances awaiting isolation in human plasma.

The merits gained through these investigations compel pediatricians to insist on early colostrum and breast feedings, since an added benefit is obvious with higher protein neonatal feedings.

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THE USE OF GENTIAN VIOLET IN CHILDREN INFECTED WITH ASCARIS LUMBRICOIDES

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THE work of Wright, Brady, and Bozicevich[13] and of D'Antoni and Sawitz[4] has demonstrated that gentian violet is unquestionably the drug of choice in the treatment of infections of the pinworm, *Enterobius vermiculais*. It has been given to thousands of infected persons without a recorded fatality. The drug is administered three times a day before meals and has been given for from ten to thirty consecutive days. Nausea, vomiting, abdominal pain, lassitude, and diarrhea occasionally follow the administration of repeated daily oral doses of gentian violet, but these reactions quickly subside when the dosage of the drug is decreased or is discontinued for a day or two.

According to Wright and Brady[14] "contraindications for the use of gentian violet include concomitant infestations with *Ascaris lumbricoides*, moderate to severe cardiac, hepatic or renal disease, alcohol and diseases of the gastro-intestinal tract." Unquestionably these workers were wise in suggesting contra-indications to the use of gentian violet until the toxicity of the drug in man could be more thoroughly studied. However, they give no experimental evidence and the literature does not point definitely to the production of obstruction or the migration of *Ascaris* by gentian violet or an enhanced toxicity of gentian violet when *A. lumbricoides* is present, and the subject therefore seems to justify further exploration. This is particularly indicated, in view of the fact that gentian violet was first used by DeLangen[5] against *Strongyloides stercoralis* which invades the intestinal mucosa, and Faust and Yao[6] began its use in *Clonorchis sinensis* infections which may produce marked alterations in the liver of man. The course of therapy in *Clonorchis* infections may be two to three times as long as that recommended for *Enterobius*.

If gentian violet is irritating to *Ascaris* and thereby causes serious complications, its routine use in pinworm infections without first eliminating the *Ascaris* present might be dangerous. A routine frequently followed is to treat for pinworm on the basis of a positive N. I. H. cellophane swab (or an adult worm found on the stool by the patient) which seldom detects the presence of *Ascaris*. According to this warning an examination of the stool for *Ascaris* and its treatment if found is imperative.

It is known, of course, that carbon tetrachloride when given to *Ascaris* infected persons may cause the worms to migrate or entwine themselves together and produce intestinal obstruction (Lamson, Minot, and Robbins.[10] Until this appears not to happen in the case of gentian violet, it should be given consideration in the use of that drug in the presence of *Ascaris*. The chemical constitution

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of gentian violet is, however, so different from that of carbon tetrachloride that it would be surprising if their action on *Ascaris* were similar.

Kouri, Sellek, and Rivera[7] reported treatment with gentian violet of two children who harbored both *Strongyloides stercoralis* and *A. lumbricoides* and noted no evidence of the migration of *Ascaris* or of intestinal obstruction due to them. The children were 8 and 12 years old and were given 100 mg. of gentian violet daily for ten consecutive days. The 12-year-old child was later given an additional five-day course of gentian violet.

On questioning physicians practicing in the mountainous areas of our southeastern states as well as one in the tropics where both *Ascaris* and *Entero bius* are often found to be present in the same individual, I learn that they have been treating pinworm with gentian violet without first ascertaining whether or not *Ascaris* is present and eliminating it. They have noted no untoward reactions. In one mountainous area where I recently found 60 per cent of the children in one school infected with *Ascaris*, a local physician has never seen a case of obstruction due to *Ascaris* despite the fact that it is his custom in this area to treat children with gentian violet for pinworm.

To test the possible stimulating effect of gentian violet upon *Ascaris* a number of live *A. lumbricoides* were secured from pigs at a slaughter house and immersed in varying concentrations of gentian violet in salt solution. The worms were maintained at 35° C. and observed for two hours. (Table I.)

TABLE I. ACTIVITY OF ASCARIS LUMBRICOIDES (FROM SWINE) IN GENTIAN VIOLET SOLUTIONS

GENTIAN VIOLET CONCENTRATION	WORMS	TIME IN GENTIAN VIOLET AT 35° C. (HR.)	ACTIVITY
1 to 1,000	4	2	Slightly more active than controls†
1 to 10,000	4	2	Same as controls
1 to 20,000	4	2	Same as controls
1 to 50,000	4	2	Same as controls
1 to 100,000	4	2	Same as controls
Controls	4	2	

It will be noted in Table I that the gentian violet solutions did not stimulate the worms to especial activity and did not result in their clumping together. The worms in the 1 to 1000 gentian violet solutions were perhaps slightly more active than the controls, the difference in activity, if any, however, was not marked.

In light of the findings in Table I and in view of the failure of the gentian violet to stimulate *Ascaris* to migrate or cause obstruction in patients treated for *Strongyloides* or pinworm and since three out of four *Ascaris* infected dogs treated with this drug passed part or all of their worms, it was deemed safe and worth while to test it on *Ascaris* infected children.

Twenty children harboring *A. lumbricoides* were given gentian violet by mouth two or three times a day for ten consecutive days. (Table II). The usual gentian violet daily dosage for pinworm (10 mg. per year of age) was followed as closely as the 32 mg. pills would permit. Children 8 years of age or younger were given 2 pills of 32 mg. gentian violet daily and children of 9

years of age and older were given 3 such pills. The pills were "Seal-Ins" timed to break up in four and one-half hours and were taken from one-half to one hour before meals. Stools were collected from time to time to check the presence of the gentian violet in them and the children were questioned daily for evidence of toxicity of the drug.

There was no evidence that the *Ascaris* were stimulated by the gentian violet. No worms migrated out of the mouth or anus and there was no evidence of intestinal obstruction by them. Only two children complained of abdominal pain. It occurred in both on the sixth and seventh day of treatment. The pain in one child was deemed sufficient for the drug to be discontinued for the seventh day of treatment, the other child continued treatment. The abdominal pain disappeared in both and was probably caused by the gentian violet, as such distress is encountered in persons taking gentian violet who are not infected with *Ascaris*. Two children became nauseated but did not vomit. A daily check was made on the number of stools passed by each child. In general the number increased slightly during treatment and there was a tendency toward looseness. The absence of vomiting, abdominal distention, and the presence of several daily bowel movements definitely rules out intestinal obstruction by the *Ascaris* in the treated children.

The stools of the children treated with gentian violet were all egg-counted by the Stoll and Hausheer[11] technique before treatment and one week after the completion of the ten-day treatment with gentian violet. Results are shown in

TABLE II. ADMINISTRATION OF GENTIAN VIOLET TO CHILDREN INFECTED WITH ASCARIS LUMBRICOIDES—"SEAL-INS" PILLS GIVEN FOR TEN CONSECUTIVE DAYS

NO.	AGE	WT.	DOSE MG. DAILY	EGG COUNT 0.075 C.C. BEFORE TREATMENT	EGG COUNT 0.075 C.C. AFTER TREATMENT	TOXICITY
1	12	114	96	4,300	0	None
2	13	104	96	26,500	28,000	None
3	12	96	96	1,400	20,500	None
4	12	90	96	27,600	19,900	None
5	10	80	96	2,600	3,000	None
6	10	80	96	1,000	0	Abdominal pain sixth and seventh days of treatment
7	12	80	96	1,600	200	Nausea
8	10	76	96	8,400	5,900	None
9	11	74	96	14,000	0	Nausea
10	10	70	96	1,900	300	None
11	11	70	96	5,900	18,500	Abdominal distress sixth and seventh days of treatment; no drug given on seventh day
12	11	68	96	2,300	7,800	None
13	9	68	96	900	2,200	None
14	9	68	96	500	0	None
15	11	66	96	75,700	35,400	None
16	7	60	64	15,200	4,800	None
17	8	60	64	80,400	39,400	None
18	8	56	64	24,600	6,700	None
19	7	50	64	8,500	500	None
20	8	50	64	5,000	700	None
Total				308,000	193,800	

Table II. It will be noted that four of the infected children lost all of their worms during treatment and that the total egg count of the group fell from 308,300 to 193,800 per cubic centimeter of feces, a reduction of 37 per cent. On the basis of this study gentian violet cannot be classed as an effective ascaricide, although it appears to have some activity against this parasite.

DISCUSSION

The failure of routine gentian violet pinworm therapy to stimulate *A. lumbricoides* to migrate or produce intestinal or pharyngeal obstruction in twenty treated children indicates that this drug is not specifically irritating to the worm. It is possible, however, that if large numbers of *Ascaris* infected individuals were given gentian violet, that instances of migration or obstruction by the worms might be encountered. Such was reported by Lambert[9] to be the case in *Ascaris* infected persons treated with carbon tetrachloride. Lamson, Minot, and Robbins[10] also reported several instances of *Ascaris* migration and pharyngeal and intestinal obstruction following the administration of carbon tetrachloride. On the other hand many persons infected with *Ascaris* have been given carbon tetrachloride without untoward results.[8] The chemical constitution of gentian violet, a methylrosaniline, is very different from that of carbon tetrachloride, a halogenated hydrocarbon, and there seems no more reason to suspect gentian violet of this "stimulating" property than the many sulfonamide compounds which are given without a thought of *Ascaris* complications.

Migration of *Ascaris* and obstruction occurs occasionally in so-called normal children infected with *Ascaris* and perhaps more commonly in persons with fever.[3] Watkins and Moss[12] reported two cases of acute intestinal obstruction in children before and following treatment with the time honored *Ascaris* remedy, santonin.

It is recognized that an individual infected with *Ascaris* and with pinworms should have both parasites eliminated. Since the treatment of the *Ascaris* infection can readily be accomplished with hexylresorcinol ("Crystoids" Anthelmintic) and as some of the *Enterobius* will likewise be eliminated at the same time, it is suggested that this treatment precede the gentian violet treatment aimed specifically at *Enterobius*.[1, 2]

SUMMARY

1. Gentian violet therapy for ten consecutive days did not produce findings suggestive of migration of *A. lumbricoides* or in intestinal or pharyngeal obstruction in twenty treated children. It appears, therefore, that gentian violet is not a specific irritant to *Ascaris*.

2. A 37 per cent reduction in the *Ascaris* egg count following gentian violet therapy suggests that this substance is slightly effective against *Ascaris*.

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TOXOPLASMOSIS IN A LARGE MINNESOTA FAMILY

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IT WAS found by Wolf, Cowen, and Paige in 1939[1] that a protozoan of the genus *Toxoplasma*, long known to be pathogenic for certain lower animals, can also infect man, producing the disease, toxoplasmosis. In man the infection can be either congenital or acquired. The most common signs in the congenital form are hydrocephalus, microcephalus, chorioretinitis, cerebral calcification (demonstrable by roentgenogram), and psychomotor disturbances, especially convulsions. The acquired disease usually produces the symptoms of an acute encephalitis, or more rarely an atypical pneumonia with a generalized maculopapular skin eruption. Since 1939 thirty-odd human cases of toxoplasmosis have been reported.[1-10] However, at the present time little is known regarding the epidemiology of the disease. Therefore, case reports with special studies relating to the circumstances under which the disease makes its appearance should continue to be of value.

Reports in the literature indicate that mothers of infants with toxoplasmosis usually have demonstrable antibodies against the toxoplasma organism in their blood. However, extensive investigations of such families have not been reported. Obviously, knowledge concerning the entire family of each proved case would be of great importance in determining the infectivity rate and the range of variation in symptomatology in such cases.

We were fortunate in having the opportunity to study a typical case in a 14-year-old girl who was a member of a large Minnesota family. The patient had ten living siblings and five other close relatives, all of whom were very cooperative. Complete physical studies, including funduscopic examinations, were made on eleven members of the family. Neutralization tests against the toxoplasma organism were done on blood serum from these and four other members of the family group. Two siblings of our patient could not be studied as one was in the Army overseas and the other died at birth with an enlarged head. The latter sibling might have suffered from hydrocephalus due to toxoplasmosis occurring in utero, a condition not infrequently referred to in the literature.[3] Since no post-mortem examination was made, however, this cannot be listed as a proved case.

CASE REPORT

C. G. was a 14-year-old white female, the sixth of twelve children born of two seemingly normal adults of German extraction. She had complained of nervous headaches since she was a small child. At 12 years of age she first complained of transitory spots before her eyes unassociated with any particular activity. Coincidentally, she began to have occasional pain in the right eye, heard noises in the right ear, and suffered from attacks of

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nosebleed every three or four weeks. Nine months before admission to the hospital, the headaches became more severe and were described as "migraine-like" by the patient. They occurred one or two times monthly and were frequently accompanied by vomiting. At times she became somewhat lethargic and frequently slept from three to four hours during the day.

Although the patient was said to have been born one month prematurely, her birth weight was seven pounds. She was bottle fed. She received cod-liver oil but no orange juice. She walked at 10 months of age and said words at 17 months. When the patient was in the fourth grade at school, the school physician informed the mother that she had no central vision in the right eye. In spite of this poor vision, however, the child did very well in school, receiving high grades until the severity of her attacks of headache required her to stay at home.

At the time of her admission to the hospital, physical examination showed her to be a fairly well-developed, well-nourished, cooperative, intelligent, 14-year-old white female who did not appear acutely ill. The head was 56 cm. in circumference, a normal measurement for her age. The body temperature was 98° F.; pulse, 96; respirations, 22; and blood pressure, 110/70. The general physical examination was negative, but the neurological examination revealed several positive findings.

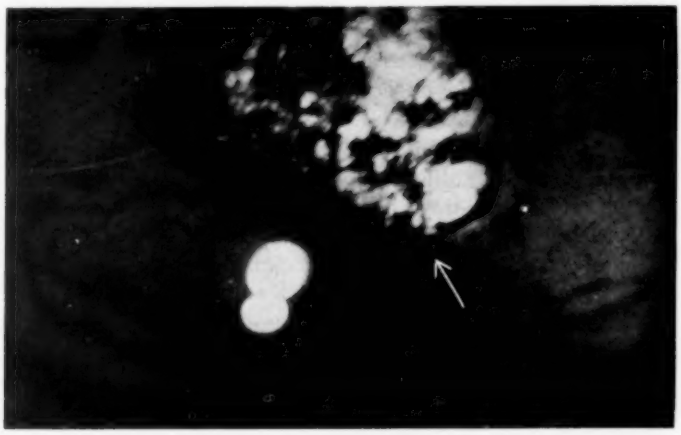

Fig. 1.—A photograph of the fundus of the patient's right eye showing an area of chorioretinitis indicated by the arrow. The circular white areas are reflections of light.

The cranial nerves were normal except for II and VIII. Funduscopic examination of the eyes showed a bilateral papilledema of about two diopters. The retina of the right eye, as shown in Fig. 1, had a large central area of degeneration with patches of black pigment, white exposed sclera, and some choroidal vessels. The area was about two disc diameters across and was sharply demarcated. The left retina had two smaller areas of degeneration which consisted of black pigment deposits one-fourth disc diameter across. These areas were interpreted as evidence of chronic chorioretinitis. There was no indication that this was an active process. The visual fields for both eyes were normal peripherally, but there was a large central scotoma in the right field. The visual acuity was nearly zero in the right eye and 20/160 in the left. Audiogram readings revealed a slight loss of hearing in the right ear in the low frequencies; readings of the left ear were normal. The superficial and deep reflexes were normal throughout, except for hyperactivity of the knee and ankle jerks. The great toe signs were negative. A fine tremor, which was accentuated on exertion, was present in both hands but was more prominent in the left. While coordination was slightly impaired, sensation was intact throughout.

Laboratory examinations showed the urine, hemoglobin, white blood cell count, and differential, as well as the sedimentation rate, to be normal. The Mantoux and Wassermann tests were negative. Roentgenograms of the skull showed evidence, as seen in Fig. 2, of a generalized increase in intracranial pressure. One small area of calcification could be seen. This was thought to be in the choroid plexus. The possibility of the patient having toxoplasmosis was suspected because of the unexplained chorioretinitis and signs of chronic increased intracranial pressure. Neutralization tests* against toxoplasma carried out by one of us (C. E.) proved to be positive.

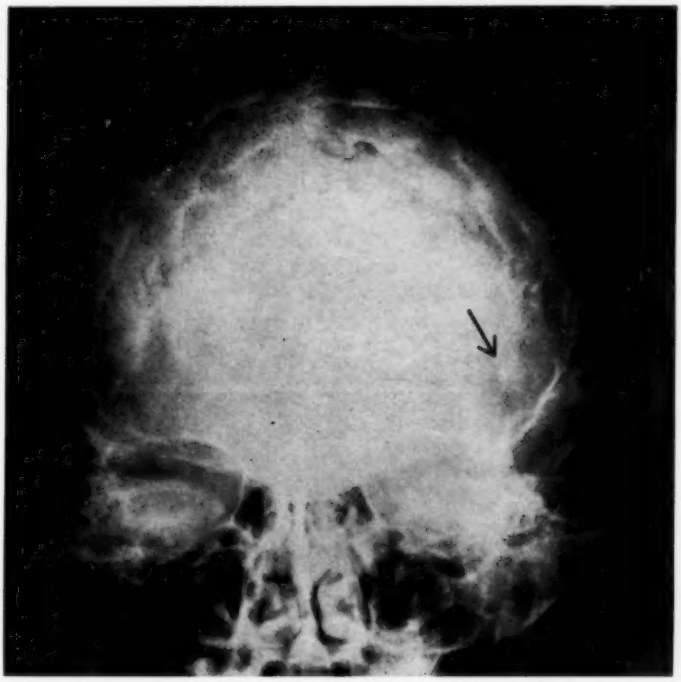

Fig. 2.—A roentgenogram of the patient's skull showing the scalping of the inner table due to increased intracranial pressure and also a small area of calcification indicated by the arrow.

A ventriculogram was performed on July 8, 1944, because it seemed urgent to relieve the increased intracranial pressure. This revealed the presence of a marked hydrocephalus of the lateral ventricles and the third ventricle but no filling of the aqueduct of Sylvius or of the fourth ventricle as seen in Fig. 3. Since there were no other findings in the neurological examination suggestive of a cerebellar or a midbrain tumor, the tentative conclusion was reached that the obstructing lesion was probably inflammatory in character and was due to the *Toxoplasma* infection. On July 12, 1944, the posterior fossa was exposed through a suboccipital incision and the arch of the first cervical vertebra was removed by Dr. W. T. Peyton, to whom we are indebted for a description of the surgical procedures employed. When the cisterna magna was opened, fluid appeared to come from the third ventricle through the aqueduct. Nevertheless, a Thorkildsen type of drainage

*An intracutaneous test done on the back of a rabbit using various dilutions of the toxoplasma with the patient's undiluted serum.

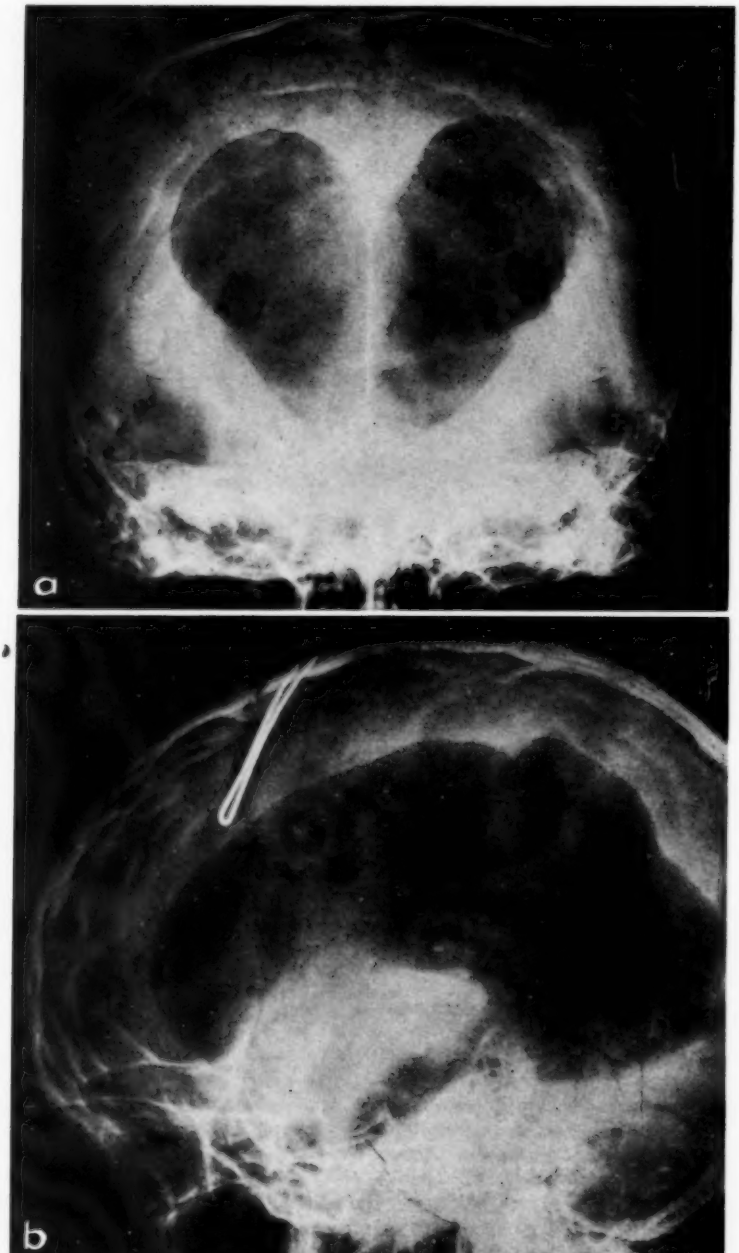

Fig. 3.—*a*, Anteroposterior and *b*, lateral views of the skull and brain as shown in a ventriculogram. Marked hydrocephalus of the lateral and third ventricles but no filling of the aqueduct or fourth ventricle can be made out.

of the right lateral ventricle into the cisterna magna was carried out, a properly fashioned lucite tube 3 mm. in diameter being used instead of a rubber catheter.

Subsequent to this operation the patient was symptomatically improved for a while but then became progressively worse. She complained of headache, became apathetic and incontinent, and the operative wound began to bulge. On August 14, 1944, the lucite tube was removed and the choroid plexus in the right lateral ventricle was destroyed by coagulation. It was felt that the *Toxoplasma* in some way might have caused a decrease in the absorption of cerebrospinal fluid, thereby upsetting the secretion-absorption balance. Such an imbalance has in some instances been corrected by destroying part of the choroid plexus.

Her immediate postoperative course was uneventful except for one generalized convulsion. Since the last operation the patient has shown progressive improvement with a complete cessation of headaches, vomiting, tinnitus, epitaxis, lethargy, and pain in the eye. She occasionally complains of scotomas, but this symptom is undoubtedly due to an irreversible process related to the chorioretinitis. There has been observed a gradual increase in visual acuity in the left eye. With correction of a fairly marked refractive error, the visual acuity in the left eye was found to be 20/20 in January, 1945. The vision in the right eye was not improved.

While psychometric tests were unfortunately not carried out before cauterization of the choroid plexus was done, six months following this procedure the patient showed an intelligence quotient of 109 on the Stanford-Binet scale. Such a high rating seemed quite remarkable in view of the severe hydrocephalus known to have been present.

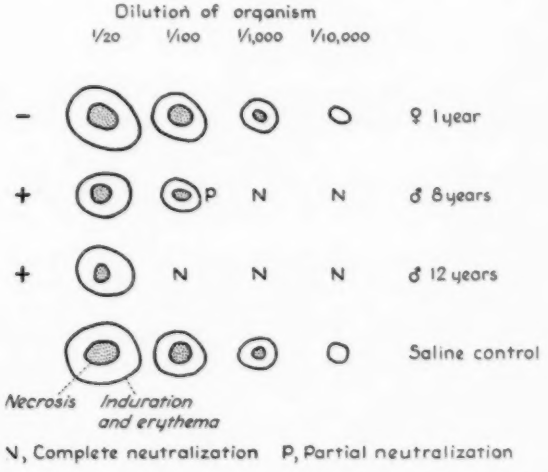

Fig. 4.—A freehand tracing of lesions from the intracutaneous neutralization tests done on the back of a rabbit. Three of the siblings, with varying degrees of neutralization, and a saline control are shown. The 1-year old sibling is the only one who showed no neutralization.

Since the clinical diagnosis of toxoplasmosis was confirmed by the positive neutralization test, blood for similar tests was obtained also from the mother, father, grandfather, two great aunts, and nine siblings of the patient. All of the siblings tested showed positive neutralization tests except the youngest child who was 12 months of age at the time. Several examples of the tests are shown in Fig. 4. The mother's neutralization was fully as strong as the patient's. The father and the two maternal great aunts of the patient were negative. However, the serum of the patient's maternal grandfather did show slight neutralization, the significance of which is problematical. These results are briefly summarized in Fig. 5.

Following the discovery of the many positive neutralization tests in this family against the *Toxoplasma*, we became interested in determining how many of the members exhibited the signs and symptoms of the disease. Accordingly each sibling and the mother of the patient were given a complete physical and neurological examination, including funduscopic study. Roentgenograms of the skull of each subject were obtained and the hemoglobin, white blood cell counts, and sedimentation rates were done on each. All of the siblings and the mother were found to be normal on these physical, laboratory, and x-ray examinations except for the presence of a corneal scar in one eye of the mother which had been present since she was 3 years of age.

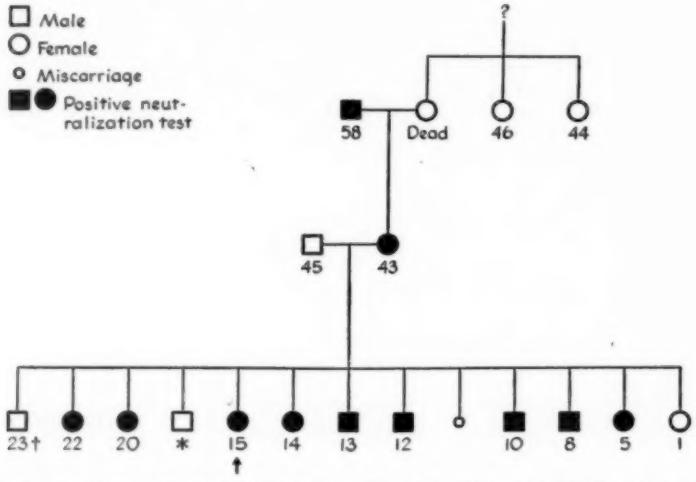

Fig. 5.—A pedigree chart showing the number of positive neutralization tests found in the family of C. G. The arrow points to the patient, C. G.
†Indicates a healthy sibling not tested.
•Indicates a full term infant who died of an enlarged head soon after birth.

DISCUSSION

Toxoplasmosis probably occurs in infants and children with much greater frequency than is at present appreciated. It should be considered in the differential diagnosis of all cases showing hydrocephalus, microcephaly, chorioretinitis, cerebral calcification, psychomotor disturbances, encephalitis, and atypical pneumonia accompanied by a spotted-fever-like rash. That the disease can be acquired in utero appears to have been demonstrated beyond question. The *Toxoplasma* probably crosses the placental barrier and infects the fetus. The infection can manifest itself at an early age, thereby producing a fetus or a newly born infant with hydrocephalus or microcephalus, or it can remain relatively latent until early childhood. Without serologic tests in early infancy or definite knowledge of the mother's infection having existed before the child's birth, it is impossible to determine with certainty whether the disease in an older child is congenital or acquired. Positive neutralization tests in the siblings as well as in the mother might merely mean that all had acquired the infection from a common source. The fact that the only sibling of our patient, C. G., to show a negative neutralization test was an infant might be interpreted as in-

dicating that infection in the others was acquired post partum, but this circumstance alone does not constitute adequate proof for such a conclusion. An intensive investigation of the farm animals and wild life of the region as a possible source for this infection is contemplated. The positive neutralization tests in the siblings of our patient who had no signs or symptoms of toxoplasmosis when examined merely indicates that they have been infected, whether ante partum or post partum.

The complete and prolonged relief of symptoms caused by progressive hydrocephalus in our patient by partial coagulation of the choroid plexus is a point of special interest. The fact that her intelligence had been little if at all impaired by the degree of hydrocephalus present is likewise worthy of special note. This, together with the recency of development of acute symptoms and signs of increased intracranial pressure, indicates that blockage of the ventricular system could not have been present over a long period of time.

SUMMARY

1. A typical case of toxoplasmosis occurring in a 14-year-old girl is reported.

2. Positive neutralization tests against the Toxoplasma organism were present in the patient, her mother, and eight of nine siblings tested.

3. The mother and the nine siblings had no clinical symptoms or signs of toxoplasmosis as determined by physical and roentgenologic examination.

4. Partial coagulation of the choroid plexus gave complete and prolonged relief of symptoms due to hydrocephalus.

5. Preservation of essentially normal intelligence in spite of the presence of fairly marked hydrocephalus was notable.

6. Whether infection in this patient and her siblings was congenital or acquired could not be ascertained from the available data.

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ADDENDUM

Since this manuscript was submitted, we have had an opportunity to examine and do serologic tests on the oldest sibling of our patient. Physical examination, including funduscopic and roentgenologic tests, was entirely normal on this sibling; however, several neutralization tests against the toxoplasma were definitely positive.

A COMPARATIVE STUDY OF THE "IMMUNE RESPONSE" TO VARIOUS PERTUSSIS ANTIGENS AND THE DISEASE

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THE primary objectives of this investigation were first, to learn what factors are involved in pertussis immunity; and, secondly, to determine what constitutes an effective prophylactic agent against pertussis.

Within the last few years the value of *Hemophilus pertussis* vaccines for active immunization against whooping cough has received considerable attention and has been the object of extensive clinical investigations. The results obtained by a number of workers, summarized by Maclean,[1] Strean and associates,[2] and the Council of Pharmacy and Chemistry of the American Medical Association,[3] show that, although the immunity produced is substantial, it is not of the solid type known to occur after some other prophylactic, such as diphtheria toxoid. Likewise antibacterial serum for treatment and bacterial antigen for testing susceptibility have not yielded results sufficiently conclusive to warrant universal usage of these agents.

H. pertussis is known to elaborate a toxin which is lethal for mice, guinea pigs, and rabbits when injected intravenously, and dermonecrotic in small doses. In agreement with Evans[4] and Strean[5] it seems reasonable to believe that resistance to such a potent toxin which is also antigenic might have some importance in immunity.

In view of the importance of pertussis endotoxin and antiendotoxin (Strean[6-10]), it was deemed advisable to study the nature of this material as compared with pertussis bacterial vaccines and the Lederle Detoxified Antigen. The latter is prepared from the filtrate of pertussis broth cultures, whereas the pertussis endotoxin is prepared by physical disruption of the organisms, followed by subsequent chemical treatment. In this direction animal and clinical studies were conducted.

ANIMAL EXPERIMENT

Six rabbits which gave identical skin reactions to .025 M.L.D. and .037 M.L.D. of glycerinated toxin were chosen. Two rabbits were immunized with the detoxified pertussis antigen, two rabbits with Sauer's vaccine, and two rabbits were designated as control animals. The rabbits were injected subcutaneously, once each week, so that after six weeks each had received a total of 6 c.c. of the respective antigen. The first inoculation consisted of a 0.5 c.c. dose, the next four injections were of 1 c.c. amounts and the last inoculation was a 1.5 c.c. dose. The animals were tested for antitoxin and agglutinins two weeks after the final inoculation.

Antibody Titration Techniques.—The *antitoxic response* was titrated in minimum reactive doses (M.R.D.) determined by intradermal inoculations of

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We wish to acknowledge our gratitude to Ayerst, McKenna & Harrison, Limited, Rouses Point, N. Y. and to Lederle Laboratories, Inc., Pearl River, N. Y. for materials provided in the conduct of this study.

0.2 c.c. of toxin diluted in saline. The end point (M.R.D.) was the highest dilution that caused a necrotic area in the control rabbits. On this basis we determined the number of minimum reacting doses of toxin against which the immunized animals were protected.

The agglutination response was determined by a macroscopic tube agglutination test. Tubes 10 by 75 mm. were used. In the first tube 0.1 c.c. of serum was added to 0.4 c.c. of 0.85 per cent sodium chloride by means of a calibrated capillary pipette. After mixing twenty times by withdrawing into the pipette, 0.25 c.c. of the original dilution was transferred to the second tube to which 0.25 c.c. of 0.85 per cent of sodium chloride had been added. Subsequent dilutions were made similarly until 9 dilutions of serum had been made.

To the 0.25 c.c. of diluted serum in each tube, 0.25 c.c. of antigen (100 billion organisms of Phase I per cubic centimeter) was added. This gave final serum dilutions of 1:10 to 1:2,560. The tubes were shaken for two minutes and placed in the 37° C. incubator for two hours, with occasional shaking. The tubes were read with the naked eye by holding them against an ordinary bull's eye microscope lamp in a darkened room.

Procedure.—For the intradermal titration of the toxin, we removed the hair from the backs of the rabbits by means of a barium sulfide-starch depilatory mixture. We then marked the depilated areas into appropriate squares with carbol fuchsin. Inoculations of 0.2 c.c. amounts were made.

Results.—The highest dilution producing necrosis in the control rabbits was that of 1:160. Since there was necrosis at the 1:160 dilution and not at the 1:320 dilution, the critical dilution may have been somewhere between these two values. The necrosis at 1:160 did not appear very strong and, therefore, it did not seem likely that a much higher dilution would give necrosis. Nevertheless, dilutions ranging from 1:160 through 1:320 were made up so that dilutions of 1:160, 1:180, 1:200 were used for the final titration. Necrosis was again produced only at the 1:160 dilution, the 1:180 dilution showing only a slight suggestion of inflammation but no definite necrosis. Therefore, 0.2 c.c. of a 1:160 dilution represents the M.R.D. value of the toxin supplied to us by the Lederle Laboratories.

NECROTIC EFFECT OF PERTUSSIS TOXIN IN IMMUNIZED ANIMALS

CONTROL		SAUER		DETOXIFIED ANTIGEN	
				Undiluted	Toxin*
1:10*	1:320	1:50*	1:80*	1:2	1:16
1:20*	1:640	1:10*	1:160*	1:4	1:32
1:40*	1:960	1:20*	1:320	1:8	1:64
1:80*	1:1280	1:40*	1:640		
1:160*	Saline				

*Necrosis.

Since the rabbits immunized with Sauer's vaccine also showed necrosis in the 1:160 dilution we may conclude that these rabbits were unable to neutralize the toxin and had no antitoxic immunity.

The rabbits immunized with Lederle toxoid showed no necrosis up through the 1:2 dilution but did show necrosis with the undiluted toxin. These ani-

mals are therefore not resistant to 160 M.R.D. but are protected against 80 M.R.D. of toxin.

Thus, we have demonstrated that the Lederle detoxified antigen produces an antitoxic immunity not evoked by immunization with a bacterial vaccine like Sauer's.

Now let us consider the results obtained with the agglutination test previously described. The serum of the control animals produced agglutination through a titer of 1:40, but not 1:80. Of the two animals immunized with the detoxified antigen, one gave an agglutination of 1:160 and the other at 1:320. The animals immunized with Sauer's vaccine gave a strong agglutination at the highest dilution then made, 1:2,560. We therefore made further dilutions up to 1:25,000 and obtained agglutination at 1:15,000 for the serum of one animal. For the serum of the other animal an agglutination was produced at a titer of 1:10,000. These results are summarized in Table I.

TABLE I. AGGLUTINATION OF PHASE I ORGANISMS WITH THE SERUM OF THE IMMUNIZED AND CONTROL ANIMALS—EXPERIMENT 1

ANIMAL	FINAL SERUM DILUTIONS WITH PHASE I SUSPENSION													
	1/10	1/20	1/40	1/80	1/160	1/320	1/640	1/1,280	1/2,560	1/5,000	1/10,000	1/15,000	1/20,000	1/25,000
Detoxified antigen 1	+	+	+	+	+	0	0	0	0	–	–	–	–	–
Detoxified antigen 2	+	+	+	+	+	+	0	0	0	–	–	–	–	–
Sauer 1	+	+	+	+	+	+	+	+	+	+	+	+	0	0
Sauer 2	+	+	+	+	+	+	+	+	+	+	+	0	0	0
Control 1	+	+	+	0	0	0	0	0	0	–	–	–	–	–
Control 2	+	+	+	0	0	0	0	0	0	–	–	–	–	–

The results obtained with agglutination by the sera of the Lederle-immunized rabbits indicate the presence of agglutinogen in the Lederle toxoid. Apparently, lysis of some of the organisms occurs during the six day cultivation in broth so that bacterial antigens as well as the toxin, are present in the filtrate.

TABLE II. SUMMARY OF ANTIBODY TITRATIONS—EXPERIMENT 1

ANIMAL	VACCINE (DOSAGE: 6 C.C. OVER SIX-WEEK PERIOD)	AGGLUTINATION TITER	NO. OF M.R.D. PROTECTED AGAINST
1	Sauer	1:15,000	0
2	Sauer	1:10,000	0
3	Detoxified antigen	1:160	80
4	Detoxified antigen	1:320	80
5	Control	1:40	0
6	Control	1:40	0

It may be noted, from Table II, that Sauer's vaccine shows a marked ability to produce agglutinins in animals immunized with this antigen. It is conceivable that the production of agglutinins plays an important role in the prophylaxis against pertussis.

ANIMAL EXPERIMENT 2

In addition to clinical investigation with combined endotoxoid vaccine (Strean) the following animal experiment was tried. Four animals were selected on the basis of their intradermal reaction to 0.025 M.L.D. of the exo-

toxin (Lederle) and the endotoxin (Strean). One received injections of Sauer's vaccine, one was immunized with detoxified exotoxin (Lederle) another rabbit was given injections with combined pertussis endotoxoid vaccine (Strean), while the fourth was designated as a control. Each animal received a total of 9 c.c. of the respective antigen and was inoculated with 1 c.c. amounts each week for the first five weeks, followed by 2 c.c. injections spaced two weeks apart. They were tested for agglutination and antitoxic immunity two weeks after the last inoculation.

Procedure and Results.—In this experiment we did not titrate the antitoxic immunity quantitatively, but compared the dermonecrosis of the immunized rabbits with that of the control rabbit qualitatively. The dermonecrosis was produced by intradermal injections of various dilutions of the Lederle exotoxin, and the Strean endotoxin. Two solutions of purified endotoxin were used: (1) endotoxin freshly reconstituted with saline; (2) endotoxin previously reconstituted with a 50-50 mixture of glycerol and broth and stored at 10° C. for one month. The Lederle exotoxin was also stabilized with 50 per cent glycerol. All of the toxin dilutions were made with nutrient broth and injected in 0.2 c.c. amounts intracutaneously. The skin reactions were observed seventy-two hours after the injections were made.

The agglutination titer was determined by macroscopic tube agglutination. The results are given in Table III.

TABLE III

VACCINE	SERUM DILUTIONS WITH PHASE I SUSPENSION							
	1/500	1/1,000	1/5,000	1/10,000	1/15,000	1/20,000	1/50,000	1/100,000
Detoxified antigen	+	0	0	0	0	0	0	0
Combined endotoxoid vaccine	+	+	+	+	+	+	+	0
Bacterial vaccine	+	+	+	+	+	+	+	0

The following observations were made with reference to the activity of the toxins and the antitoxic immunity produced:

1. The necrosis produced by the endotoxin was greater than the necrosis produced by the exotoxin per minimal lethal dose as observed from the results obtained in the control rabbit.

2. The exotoxoid-immunized animal was resistant to the dermonecrotic effects of the endotoxin while the endotoxoid-immunized animal was resistant to the dermonecrotic effects of the exotoxin.

3. The Sauer-immunized rabbit showed little or no protection against the necrotic activity of the exotoxin but was partially protected against the dermonecrosis of the endotoxin.

4. There was no apparent difference in the dermonecrotic activity of the freshly reconstituted endotoxin as compared with the stored endotoxin stabilized in a fifty-fifty mixture of glycerol and broth.

These results suggest that the endotoxin contains a factor which is dermonecrotic but not lethal for mice, in addition to a factor both lethal for mice and dermonecrotic. The latter factor, in all probability, is identical with or

similar to the exotoxin. Sauer's vaccine appears to have protected against the dermonecrotic activity of the nonlethal factor but not against the dermonecrosis produced by the exotoxin.

The agglutination titer of the rabbit immunized with combined endotoxoid-vaccine (Strean) corresponded with that of the Sauer-immunized animal. The detoxified antigen (Lederle) produced agglutinins in low titer. Obviously, then, the combined endotoxoid-vaccine is as good for the stimulation of bacterial antibodies as Sauer's vaccine, and, in addition, is capable of producing antitoxic immunity against the endotoxin and the exotoxin.

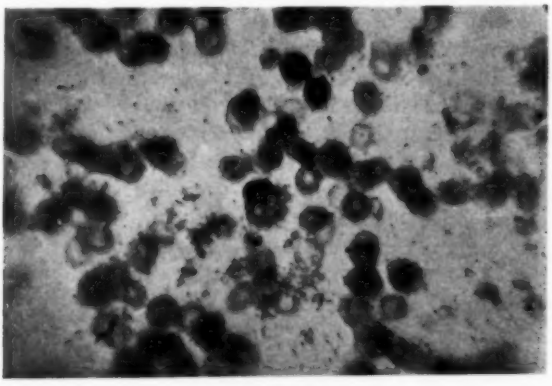

Fig. 1.—Positive reaction.

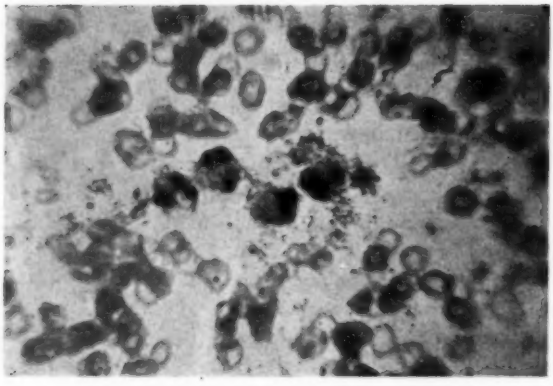

Fig. 2.—Positive reaction.

CLINICAL STUDIES

In order to study the immune response we performed antibody titrations on children at the Boston Health Department Well Baby Clinics, at the South Department of the Boston City Hospital, and at the Morgan Memorial Day Nursery. Thus, we were able to study the immune response in children who

had been inoculated with Sauer's vaccine, the Lederle antigen, and the Ayerst combined vaccine; in children during the course of illness and convalescence; and in children who had had the disease in years past. We utilized the agglutinin-opsonic index test for the detection of bacterial antibodies and the intradermal neutralization test in rabbits for the detection of circulating antitoxin as well as the Strean skin test.

Antibody Titration Techniques.—The *agglutinin-opsonic index* was developed and used by us for the detection of circulating pertussis bacterial antibodies—the test is described herewith.

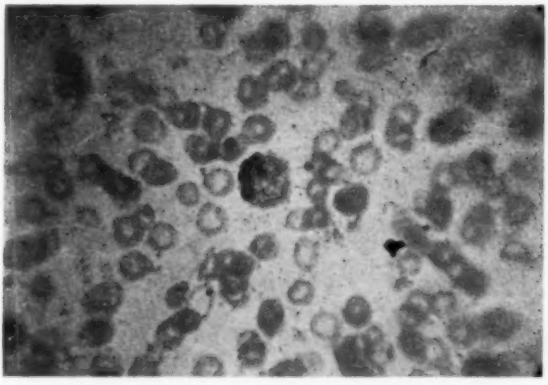

Fig. 3.—Positive reaction.

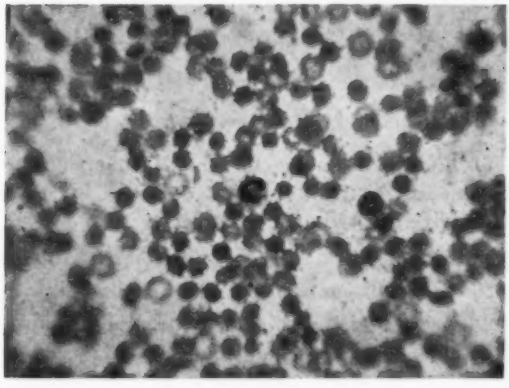

Fig. 4.—Negative reaction.

Antigen: A homogenous suspension in sodium citrate solution of killed pertussis bacilli (Phase I) standardized against positive and negative sera and adjusted to a turbidity of about 20,000 million organisms per cubic centimeter. The antigen is preserved in merthiolate 1:5,000.

Technique: The following technique was used: 0.1 c.c. of antigen is placed in a 3 by ¾ inch sterile tube. To this is added two drops (about 0.1 c.c.) of

whole blood. The blood and antigen are thoroughly mixed by rocking gently back and forth for one minute. The mixture is incubated at 37° C. for thirty to sixty minutes, with occasional shaking.

Preparation of Slides: The incubated mixture is rocked gently to redistribute the cells and organisms. With a capillary pipette, a drop of the blood-antigen mixture is placed on the end of a clean slide. The slide is placed on the table with the second index finger of one hand under the end which holds the drop. With a slide held in the other hand at an angle of about 30 degrees to the first, the drop is touched so that it follows this slide which is being drawn gently to the end of the first slide. By the time that the end of the slide is reached, the drop should be used up. The film is then dried in air and stained with Wright's stain in the usual manner.

A control is run consisting of 0.1 c.c. normal, negative blood with 0.1 c.c. of antigen.

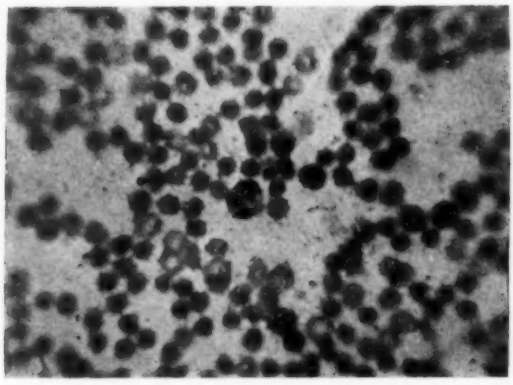

Fig. 5.—Negative reaction.

Examination of Slides: Examine under oil immersion, count twenty-five normal polymorphonuclear neutrophiles and examine for phagocytosis. The opsonocytophagic activity is rated on a 4 plus basis.

1 plus: 15 to 20 of the 25 cells contain from 20 to 50 bacilli
2 plus: 20 to 25 cells contain from 20 to 50 bacilli
3 plus: At least 20 of the 25 cells contain 50 or more bacilli
4 plus: All 25 cells contain 50 or more bacilli

Agglutination: Observed on the same slide and rated on a 4 plus basis:

1 plus: Definite small clumps, scattered free bacilli
2 plus: Majority of organisms agglutinated, small clumps, few free bacilli
3 plus: Nearly all organisms agglutinated, large clumps and small clumps
4 plus: Complete agglutination, all large clumps

As a general rule, it is best to look for phagocytosis at the beginning of the smear and for agglutination toward the end of the smear.

THE TITRATION OF CIRCULATING ANTITOXIN

The titration of circulating antitoxin is based on a comparison of the necrosis produced by a standard toxin dilution with the necrosis produced by a serum-toxin mixture when injected intradermally in rabbits.

The total volume in the neutralization tube is 2.5 c.c. This volume contains 1 c.c. of serum plus toxin and broth. The contents of the tube are well mixed and placed in a 37° C. incubator for one hour. Two cubic centimeters of the dilution are then pipetted from the neutralized mixture into 2 c.c. of broth, in Wasserman tubes. The original dilution and the two successive 1:1 dilutions are injected into the test rabbits intradermally in 0.2 c.c. amounts (since rabbits vary in their sensitivity to the toxin it is necessary for the test rabbits to give a readable necrosis with 0.025 M.L.D. of toxin in order that they may be used for purposes of titration). Readings are made in from 48 to 72 hours. Each rabbit is also given a series of injections with control toxin dilutions. The controls are made so that one has a 0.025 M.L.D., a 0.037 M.L.D., a 0.05 M.L.D., and a 0.1 M.L.D. in a 0.2 c.c. injection of the dilutions of the standard toxin.

The antitoxin in the serum is estimated in units comparable to the M.L.D.'s of standard toxin neutralized by the serum. The amount of excess toxin present in a serum-toxin mixture is determined by a comparison of the necrosis produced with the toxin in the controls.

Antibody Titrations in Nursery Children.—A group of children enrolled in the Roof Nursery at several of the Boston Health Department Well Baby Clinics were tested for agglutination, opsonic activity, and circulating antitoxin. Several of the children had been previously immunized with Sauer's vaccine, a large number of them had had the disease, while others had neither been immunized nor ill with pertussis. Their histories with respect to pertussis were obtained from the files of the Well Baby Clinics. The results obtained are summarized in Table IV.

TABLE IV. RESULTS OF ANTIBODY TITRATIONS IN CHILDREN ENROLLED AT THE WELL BABY CLINICS OF THE BOSTON HEALTH DEPARTMENT

HISTORY	NO. OF CHILDREN	AGGLUTINATION					OPSONIC INDEX					ANTITOXIN	
		4+	3+	2+	1+	0	4+	3+	2+	1+	0	POSITIVE	NEGATIVE
Pertussis	24	1	3	6	3	11	3	5	11	1	4	3*	21
Sauer's	8	1	6	1				5	2	1		-	8
Negative	22			1		21	1	-	-	-	21	-	22

*Each of the three serum samples contained less than 0.3 unit of antitoxin.

THE AGGLUTININ-OPSONIC INDEX FOLLOWING PERTUSSIS INFECTION

In order to observe the production and persistence of circulating bacterial antibodies following a pertussis infection, fifty-one children from the West End and North End districts of Boston who had had pertussis in the past

TABLE V. THE AGGLUTININ-OPSONIC INDEX IN CHILDREN WITH A HISTORY OF PERTUSSIS

TIME ELAPSED SINCE CHILD HAD PERTUSSIS	NO. OF CHILDREN	AGGLUTINATION					OPSONIC INDEX				
		4+	3+	2+	1+	0	4+	3+	2+	1+	0
6 mo. to 1 yr.	10	–	2	5	3	–	–	6	2	2	–
1 to 2 years	16	1	–	5	9	1	1	3	6	6	–
2 to 3 years	18	–	1	2	12	3	–	7	6	3	2
Over 3 years	7	1	–	2	2	2	–	2	1	3	1
Total	51	2	3	14	26	6	1	18	15	14	3

few years were tested. The children varied in age from 18 months to 8 years. The results are summarized in Table V.

Agglutinin-Opsonic Index During Course of Illness.—In order to determine how soon pertussis antibodies were formed, we tested thirteen pertussis patients at the South Department of the Boston City Hospital by means of the agglutinin-opsonic index test. In addition, we also took nasopharyngeal cultures to demonstrate the presence of Phase I pertussis organisms. The results obtained are shown in Table VI.

TABLE VI. THE AGGLUTININ-OPSONIC INDEX IN PERTUSSIS PATIENTS AT THE SOUTH DEPARTMENT OF THE BOSTON CITY HOSPITAL

NAME	SEX	AGGLUTINATION	OPSONIC INDEX	NASOPHARYNGEAL CULTURE
R. P.	F	++	+	+
J. P.	M	+++	+++	–
S. P.	M	+++	++++	–
D. D.	M	++	+	–
K. B.	F	+	–	–
R. H.	F	+	++	+
H. B.	F	+	++++	–
B. S.	F	–	–	–
M. M.	M	+	–	+
R. E.	M	+	–	–
R. C.	M	++	+++	–
T. Mc.	M	+++	+++	–
M. H.	F	+	+	–

Interpretation of Results.—From the results summarized in Tables IV to VI we may conclude that the predominating "immune response" to a pertussis infection is the production of bacterial antibodies such as agglutinins and opsonins. The production of these antibodies begins early in the spasmodic stage of the disease, increases during the convalescent stage, and persists at a high level for at least several months to a year afterward. These antibodies are present in decreasing titers for several years after recovery from the disease in a comparatively large per cent of cases. Apparently there is some evidence of antitoxin production following recovery from the disease. However, the amount of circulating antitoxin that may be detected is rather minimal and was present in only a very few of the children studied. It must be admitted, nevertheless, that the limit of sensitivity of the test for circulating antitoxin does not permit the detection of much less than 0.3 of a unit of antitoxin.

Immunization with a bacterial vaccine such as Sauer's results in the production of agglutinins and opsonin in high titer. There is no evidence of the

production of antitoxin to a bacterial vaccine. These results are in essential agreement with the results of our animal experiments.

Antitoxin Titrations in Lederle-Inoculated Children.—Twelve children who had been inoculated with pertussis antigen (detoxified) were gathered at the West End Health Unit for antitoxin titrations. Most of the children were about 1 year old and had been inoculated between the ages of 6 and 9 months. The results are shown in Table VII.

TABLE VII. ANTITOXIC RESPONSE IN CHILDREN INOCULATED WITH PERTUSSIS ANTIGEN (DETOXIFIED)

SUBJECT	TIME SINCE INOCULATION	UNITS OF ANTITOXIN PER C.C. OF SERUM
1	3 mo.	0.3
2	11 mo.	0.0
3	6 wk.	1.2
4	6 wk.	0.5
5	10 mo.	0.0
6	1 yr. 1 mo.	0.0
7	5 mo.	0.8
8	1 yr. 3 mo.	0.0
9	3 mo.	0.4
10	7 mo.	0.0
11	4 mo.	0.3
12	4 mo.	0.3

These results indicate that antitoxin production follows immunization with a pertussis toxoid. However, the antitoxin levels are not high and when more than six months had elapsed since the last inoculation, no circulating antitoxin could be detected. The titers in human sera are considerably lower than those we obtained in rabbits. The rate of antitoxin production and the decline in the antitoxin level, however, appear to be similar. The maximum antitoxin level was reached at about six weeks after immunization and declined rapidly thereafter.

The Agglutinin-Opsonic Index and the Strean Test in Children at the Morgan Memorial Nursery.—Thirty-seven children, varying from 2½ to 4 years of age, were tested by the agglutinin-opsonic index method on one day and the Strean skin test on the following day. Four children who were not permitted to attend the nursery because of a suspicious cough were brought in and skin tested with the rest of the group. We also obtained cough plates from them. The results of the skin-testing were read after twenty-four hours and, as a check, we repeated our readings a second time. We found that our second set of observations was identical with the first. The results are shown in Table VIII.

A comparison of the results obtained with the Strean Test and the agglutinin-opsonic index showed that in 80 per cent of the subjects, there was essential agreement between the two tests. It was interesting to note that, even though bacterial antibodies were present, the Skin Test was strongly positive in five instances and doubtfully positive in two others. These conflicting results were present for the most part in children who had had the disease. This would seem to indicate that the antiendotoxic titer had dropped

TABLE VIII. THE AGGLUTININ-OPSONIC INDEX AND THE STREAN TEST IN CHILDREN AT THE MORGAN MEMORIAL DAY NURSERY

NAME	SEX	AGGLUTINATION	OPSONIC INDEX	SKIN TEST	HISTORY
E. D.	M	–	–	2+	Negative
E. W.	F	–	–	absent	Negative
S. E.	F	1+	1+	–	W. C. in 1942
G. G.	M	2+	1+	absent	W. C. in 1941
K. O.	F	–	–	1+	Negative
J. C.	M	–	–	2+	Negative
L. N.	F	–	–	3+	Negative
W. B.	M	–	–	2+	Negative
A. S.	F	1+	2+	–	Sauer's, 1941
N. C.	F	3+	2+	1+	Sauer's, 1942
W. R.	M	–	–	2+	Negative
J. F.	M	1+	2+	–	W. C. in 1940
R. V.	M	–	–	1+	Negative
A. S.	M	–	2+	–	W. C. in 1941
S. B.	M	2+	1+	–	W. C. in 1942
E. L.	F	2+	2+	absent	W. C. in 1942
G. D.	M	–	–	absent	Lederle toxoid, 1942
A. Z.	F	1+	2+	2+	W. C. in 1941
A. K.	F	1+	1+	–	W. C. in 1941
V. M.	F	1+	2+	–	W. C. in 1941
D. N.	M	–	–	1+	Negative
J. N.	F	1+	2+	1+	W. C. in 1942
M. D.	F	–	–	3+	Negative
L. B.	F	1+	1+	–	Lederle toxoid, 1942
R. B.	M	2+	2+	2+	Sauer's, 1942
C. T.	M	–	–	2+	Negative
A. H.	M	–	–	2+	Negative
B. S.	F	1+	2+	–	Negative
G. N.	F	–	–	2+	W. C. in 1941
L. E.	F	1+	2+	3+	W. C. in 1941
R. S.	F	–	–	2+	Negative
M. O.	F	1+	3+	–	Negative
B. O.	F	–	–	3+	Negative

SUPPLEMENTARY:

CHILDREN	SEX	SKIN TEST	COUGH PLATE
P. G.	M	–	Negative
E. K.	M	3+	Positive
A. C.	M	–	Negative
K. T.	M	1+	Positive

or that possibly the positive skin test was allergic and caused by the small amounts of agglutinogen present in the skin-testing material. It has been impossible, to date, to prepare purified endotoxin entirely free from agglutinogen. In persons who did not have a history of pertussis the Strean Test gave us reliable results.

As for the four children who had suspicious coughs, two gave a positive skin reaction and two were negative. The fact that the two children with the positive Strean test also gave rise to a positive cough plate and soon after developed clinical whooping cough may be regarded as significant.

Clinical Evaluation of the Strean Test.—In order to further evaluate the Strean test, a group of children whose histories were accurately recorded at the Well Baby Clinics of the Boston Health Department were skin-tested. The group included children who had been "immunized" with the Sauer vaccine, the Lederle antigen; children who had had pertussis; and some control chil-

TABLE IX. SUMMARY OF REACTIONS OBTAINED WITH THE STREAN TEST AT THE WELL BABY CLINICS OF THE BOSTON HEALTH DEPARTMENT

HISTORY	NO. OF CHILDREN	REACTIONS				
		DOUBTFUL	1 PLUS	2 PLUS	3 PLUS	NEGATIVE
Sauer	25	1	7	10	5	2
Lederle	26	1	12	8	1	4
Pertussis	21	1	0	2	1	17
Negative	26	1	10	7	1	7

TABLE X. PERCENTAGE OF POSITIVE, NEGATIVE, AND DOUBTFUL REACTIONS OBTAINED WITH THE STREAN TEST AT THE WELL BABY CLINICS OF THE BOSTON HEALTH DEPARTMENT

HISTORY	NO. OF CHILDREN	DOUBTFUL (%)	POSITIVE (%)	NEGATIVE (%)
Sauer	25	4.0	88.0	8.0
Lederle	26	3.8	80.8	15.4
Pertussis	21	4.8	14.3	80.9
Negative	26	4.5	81.9	13.6

dren who had never had pertussis or been immunized against the disease. A summary of the results appears in Tables IX and X.

It is significant to note that 80.9 per cent of children with a history of pertussis reacted negatively to the Strean Skin Test while those immunized with Detoxified Antigen or Sauer's vaccine as well as the negative controls, reacted in the main positively. On the whole, there was good correlation between the Strean Skin Test and the clinical histories of the children studied.

We also skin tested four infants who were about 2 months old. They were negative. Kunstler[11] reported the presence of neutralizing antibodies against pertussis endotoxin in newborn infants, which may explain these results.

The fact that we obtained positive skin tests in the majority of children who had been inoculated with the Lederle "Detoxified Antigen" does not agree with the results obtained in our experiments with rabbits. Rabbits immunized with the Lederle antigen were capable of neutralizing the dermonecrotic effect of pertussis endotoxin. It would seem, therefore, that the positive skin test in these children was of an allergic type.

In order to observe the Strean test in children inoculated with the Ayerst "Combined Pertussis Vaccine with Pertussis Endotoxoid" as an immunizing agent, as well as to ascertain whether or not the skin-testing material could elicit an allergic reaction, we performed the skin test using a heated toxin control as well as freshly reconstituted toxin. We used as subjects some of the children at the Morgan Memorial Nursery who had been inoculated with the "Combined Antigen." In addition we performed the agglutinin-opsonic index test on them. These children had received their last inoculation of the antigen two months earlier. The results of the tests are shown in Table XI.

Both the heated toxin control and the fresh toxin produced a sizable wheal on these children, indicating an allergic response. Obviously, then, unless the Strean test is carried out with a heated toxin control, it may result in erroneous interpretations because of previous inoculations with a pertussis antigen or individual idiosyncrasies.

TABLE XI. THE AGGLUTININ-OPSONIC INDEX AND THE STREAN TEST IN CHILDREN IMMUNIZED WITH THE AYERST "COMBINED VACCINE"

NAME	SEX	AGGLUTINATION	OPSONIC INDEX	STREAN TEST	
				CONTROL	TEST
G. B.	M	3 plus	2 plus	3 plus	3 plus
W. B.	M	4 plus	3 plus	3 plus	3 plus
P. C.	M	3 plus	3 plus	2 plus	3 plus
D. K.	M	3 plus	2 plus	3 plus	4 plus
D. K.	M	3 plus	4 plus	2 plus	3 plus
G. N.	F	2 plus	2 plus	2 plus	2 plus
L. N.	F	3 plus	3 plus	2 plus	3 plus
R. V.	M	4 plus	3 plus	3 plus	3 plus
E. W.	F	3 plus	3 plus	3 plus	4 plus

The fact that good agglutination and opsonocytophagic activity were observed by the agglutinin-opsonic index test is good evidence for the antigenic quality of the immunizing agent.

SUMMARY

To study the immune response in animals and in human beings the following tests were used: agglutination reactions, the opsonocytophagic reaction, antitoxin titrations, and intradermal tests. A study of these reactions in immunized rabbits and in human beings, as well as in human beings during the course of illness and after recovery from the disease, was made. The results obtained indicate:

1. Sauer's vaccine gives rise to a substantial agglutination titer and opsonic index as well as to a small amount of antibody to a dermonecrotic endobacterial antigen.

2. Detoxified antigen produces antitoxin in moderate titer and agglutinins in low titer.

3. The combined bacterial vaccine and endotoxoid produces both antitoxin and bacterial antibodies in high titer.

4. The disease itself gives rise to a moderate agglutination titer, a good opsonin titer and antitoxin of exceedingly low titer. A tissue immunity to a toxic bacterial extract is developed.

5. The bacterial antibodies are produced rapidly and attain a maximum about two to three months after immunization. They appear in the circulation during the spasmodic stage of the disease and persist in high titer from six months to a year. These antibodies have been demonstrated from two to three years after recovery from the disease in a large per cent of the children studied.

6. The antitoxin level reaches a maximum about two months after immunization with the toxoid and falls rapidly thereafter. In six to seven months, little or no circulating antitoxin may be detected. Very little antitoxin, if at all, can be demonstrated in the blood of individuals who have recovered from the disease.

In assessing the value of the Strean skin test, it was found that 85 per cent of persons with a history of pertussis gave a negative reaction. On the other hand, about 90 per cent of the children immunized with Sauer's vaccine or detoxified antigen, as well as those with no history of pertussis or pertussis immunization gave a positive reaction. There is an indication that the positive results in the Lederle-inoculated group are due to an allergic reaction, that in the Sauer-immunized group it is both toxic and allergic, whereas in the group with a negative history of pertussis or immunization, the positive reaction is largely toxic. Apparently the material used was not free from agglutinogen which gives rise to this allergic-type reaction. The Strean test indicates, in part, that the immune response after an attack of the disease is a highly efficient one. The Strean test is of definite value in determining susceptibility to pertussis when performed with a heated control.

An evaluation of the agglutinin-opsonic index test shows a high correlation between the opsonocytophagic activity and a history of pertussis. Agglutinins were not always detected together with the opsonins in children who had recovered from the disease but, in a majority of these children, both bacterial antibodies could be detected by the microscopic test. In immunized children the degree of opsonic activity paralleled the agglutinin activity. In children recovered from the disease the opsonic activity was invariably stronger than the agglutination reaction.

The results of a field investigation (pending publication in the *Journal of the American Medical Association)* indicate that Sauer-immunized children were afforded protection to a greater or lesser degree for about two years, the duration of this study. Immunization with pertussis detoxified antigen did not appear to offer any protection against an attack of pertussis but did modify the disease so that it was clinically milder in a majority of cases.

Immunization against pertussis toxin alone is not of value in prophylactic treatment of the disease, since agglutinative and opsonocytophagic antibodies are essential to protect against the initial invasion of the organism. Because some of the clinical manifestations are attributed to the action of pertussis toxin, it would be advisable to produce an immunity against this toxic factor. The "immune response" to a combined Phase I bacterial vaccine with pertussis endotoxoid more nearly corresponds to the immunity produced by an attack of pertussis.

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ONE DOSE SUBCUTANEOUS SODIUM SULFADIAZINE FOR ACUTE INFECTIONS

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THE subcutaneous administration of sodium sulfadiazine has become a more and more popular method in hospitals because of its simplicity and effectiveness. As used and studied at The Children's Memorial Hospital in Chicago,[1] this method can also be used in the care of a patient in his home, thus sparing the child hospitalization. The "one dose" oral or intravenous method has been described by several authors[2-6] and we are about to discuss the "one dose" subcutaneous method.

This method should permit the physician to treat at home the patient who is in need of intensive sulfonamide therapy but unable to take or retain oral medication. The subcutaneous route will avoid the rather difficult intravenous administration in small children and, furthermore, the *single* dose may "decrease the risk of toxic manifestations, the sensitization to the drug and the cost of treatment."[2]

We have treated twenty-four patients with acute upper and lower respiratory infections by giving them approximately 1 grain per pound of body weight of a 5 per cent solution of sodium sulfadiazine in distilled water subcutaneously. The solution was injected by syringe in one thigh, or, if necessary, divided in two portions and given in both thighs (Table I).

There was no untoward local reaction in any of our cases. Of the twenty-four patients in our series, ten had definite symptoms and signs of pneumonia, and the diagnosis was verified by x-ray pictures. Eleven had rather severe pharyngitis, tonsillitis, or otitis, or a combination of those infections. Of these twenty-four patients, nineteen received the one injection as their only sulfonamide treatment during their entire illness and they recovered rapidly. The response of the temperature curve and the drop in the leucocyte count was very dramatic in almost all cases. Subjectively and objectively these patients recovered very speedily. That frequent medications and repeated injections were not necessary was appreciated by the patient as well as the nursing staff.

In five cases the sulfonamide therapy was continued orally or subcutaneously for various reasons.

Case 1.—In this case of a child with pneumonia the temperature rose on the third day after the initial dose and remained elevated. On the seventh day it was felt to be advisable to start oral sulfonamide therapy. The patient recovered uneventfully. This was our first patient in this series and the delay in oral therapy may have prolonged the hospitalization. In our later cases we felt that in the event of a secondary temperature elevation or in very severe infections sulfonamide should be restarted and administered for a prolonged time.

From The Children's Memorial Hospital.

TABLE

CASE	AGE	WEIGHT (POUNDS)	SULFADIAZINE (GRAINS)	SODIUM BICARBONATE	TEMPERATURE RESPONSE WITHIN	TREATMENT SUCCESS	DIAGNOSIS
1. C. T.	4½ yr.	31	37.5	+	24 hours Secondary rise in 3 days	Oral sulfonamide restarted	L.L.L.; pneumonia
2. M. B.	2½ yr.	25½	30.0	+	24 hours	Recovered	L.U.L.; pneumonia
3. F. H.	2½ yr.	25	30.0	+	24 hours Secondary rise in 2 days	Oral sulfonamide restarted	Left empyema
4. K. K.	6 yr.	40½	45.0	+	24 hours	Recovered	Pharyngitis; tonsillitis
5. R. M.	2½ yr.	32	37.5	–	24 hours	Recovered	Nasopharyngitis
6. J. B.	4 yr.	30	37.5	–	24 hours	Recovered	Pharyngitis; tonsillitis; pneumonia
7. G. J.	3 yr.	28	37.5	+	24 hours	Recovered	Left bronchopneumonia
8. J. D.	3½ yr.	31½	37.5	+	24 hours	Recovered	L.U.L.; bronchopneumonia
9. D. F.	1½ yr.	26	18	+	24 hours	Recovered	Pharyngitis; otitis media
10. A. D.	1½ yr.	21	25	+	No temperature	Recovered	Nasopharyngitis
11. P. D.	2 yr.	21	30	–	48 hours	Recovered	Roseola infantum
12. G. K.	1½ yr.	28	30	–	24 hours	Recovered	Pharyngitis; otitis
13. G. S.	1 yr.	23	30	+	24 hours	Recovered	Bronchopneumonia
14. D. C.	3½ yr.	27	33	+	24 hours	Recovered	Bronchopneumonia; L.L.L.
15. R. K.	6 yr.	52	45	–	24 hours	Recovered	Tonsillitis; otitis
16. C. S.	2 yr.	20	20	+	24 hours	Recovered	Pharyngitis; bronchitis
17. M. M.	6 yr.	45	45	+	24 hours	Oral sulfonamide restarted	Otitis media; mastoiditis
18. T. T.	10 yr.	79	45	–	24 hours	Oral sulfonamide restarted	Ruptured appendix
19. B. P.	3 yr.	34½	37.5	+	24 hours	Recovered	Pharyngitis; cervical adenitis
20. M. D.	5 yr.	37½	45	+	24 hours	Recovered	Follicular tonsillitis
21. J. H.	6 yr.	43	45	–	24 hours	Recovered	Otitis media; tonsillitis
22. D. M.	4 mo.	15½	15	+	24 hours	Recovered	Pharyngitis; otitis; bronchopneumonia
23. W. N.	6 mo.	12½	15	–	24 hours	Recovered	U.R.I.; bronchitis
24. L. M.	8 yr.	42½	45	+	48 hours	Oral sulfonamide restarted	R.U.L.; pneumonia

L. L. L., left lower lobe; L. U. L., left upper lobe; U. R. I., upper respiratory infection; R. U. L., right upper lobe.

X-RAY DIAGNOSIS	WHITE BLOOD COUNT		URINALYSIS SULFADIAZINE CRYSTALS			PRESENCE OF BLOOD		BLOOD CONCENTRATION			
	DAY	LEUCOCYTES	DAY	+	−	+	−	(HR.)	(MG.)	(HR.)	(MG.)
Confirmed	1	33,200	1	−		−		1	26.8	9	23.2
	2	26,700	2	+		−		2	32.9	19	13.9
	3	14,250	3	−		−		3	33.8	30	4.8
	5	16,900						4	31.5		
Confirmed	1	21,800	2	−		−		1	28.4	6	31.9
	2	18,550	3	−		−		2	33.8	17	18.8
	3	9,300	4	−		−		3	37.4	23½	13.8
								4	36.2	28½	9.2
Confirmed	1	11,400	1	−		−		1	21.1	17½	20.6
	2	13,850	2	−		−		2	21.8	22	15.4
	3	10,500						3	28.2	26	13.8
								4	26.0		
None taken	2	9,200	2	−		−		None taken			
			3	−		−					
None taken	1	35,300	1	−		−		None taken			
	2	18,200	2	−		+					
Confirmed	2	23,800	2	+		−		13	17.0		
			26	−		−		18	14.0		
Confirmed	1	33,000	3	−		−		None taken			
	2	21,700	5	−		−					
Confirmed	1	32,650	1	−		−		None taken			
			2	−		−					
Lungs clear	4	8,100	3	−		−		None taken			
Lungs clear	4	6,650	2	−		−		None taken			
None taken	2	4,850	2	+		−		None taken			
	6	4,900									
Lungs clear	2	4,000		None taken				None taken			
None taken	2	6,070	3	−		−		None taken			
Confirmed	2	7,700	2	−		−		None taken			
			9	−		−					
Lungs clear	2	5,350		None taken				1	16.0	21	2.6
								2	16.6		
								3	14.3		
								4	13.0		
None taken	2	20,850	2	−		−		None taken			
None taken	2	15,500	2	+		−		12	17.0		
			14	−		−					
None taken	2	21,950	2	+		−		15	8.0		
	4	11,670									
None taken	3	10,600	2	+		−		10	19.8		
			3	−		−					
			17	−		−					
Clear lungs	2	20,500	1	−		−		1	23.6	21	8.6
			2	+		+		2	25.7		
			4	−		−		3	25.7		
Bronchitis	2	18,600	1	−		−		13¼	12.8		
			2	−		−					
			18	−		−					
None taken	10	6,100	1	+		+		None taken			
			2	+		−					
			9	−		−					
None taken	2	10,450	2	−		−		2	27.0		
Confirmed	3	11,150	1	−		−		None taken			
			2	−		−					

Cases 3, 17, 18, 24.—The severity of the symptoms in these cases induced us to continue sulfonamide therapy twenty-four hours after the initial dose was given. The cases represented an empyema, a mastoiditis, a ruptured appendix, and a case of very poor general condition.

Sulfadiazine blood level determinations showed that a very satisfactory concentration was reached in less than one hour after administration and that it remained within a therapeutic range for from twenty-four to thirty-six hours.

In sixteen cases sodium bicarbonate was given, either starting simultaneously with the sulfonamide or somewhat later. The urine was examined in all but two cases and sulfadiazine crystals were reported in eight cases. Of these eight patients, five received sodium bicarbonate and three did not. The urine showed red blood cells in three cases and of those two patients received sodium bicarbonate. The small number of cases does not permit any conclusion as to the relationship of alkalinization and urinary findings. However it proves that, as tested by repeated urinalyses, in our series no serious or lasting damage to the kidneys occurred. It may be mentioned at this point that two of our patients received parenteral fluids and that alkalinization, if desired, can be obtained by subcutaneous fluid administration.

SUMMARY AND CONCLUSION

A method of treatment of acute infections by a single subcutaneous administration of sodium sulfadiazine has been studied on twenty-four patients and is tabulated.

We believe that this method of treatment may be of use to the practicing physician in treating his patients in their homes. It may also be used to advantage in the ambulatory clinic patient and in rural communities where hospitalization facilities are scarce. No trained personnel is needed and the nursing care of the patient is simplified.

This method is not recommended in cases of pneumonia with complications or for very severely ill patients who should receive a regular course of sulfonamide therapy following the initial injection.

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COMPARISON OF ABSORPTION OF VITAMIN A AFTER ORAL AND INTRAMUSCULAR ADMINISTRATION IN NORMAL CHILDREN

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THE parenteral administration of vitamin A has been widely recommended and used, especially for patients having pancreatic cystic fibrosis.

After the work of Andersen[1, 2] and other authors, the pulmonary changes associated with pancreatic achylia have been related to vitamin A deficiency, because squamous metaplasia of the epithelium has been found, but whether the lack of the vitamin is the only cause of the pathologic lesions is still unknown. At any rate, the pulmonary condition often does not improve despite the administration of large amounts of the vitamin given over long periods of time. This negative result, obtained by all the people who have worked with fibrocystic disease of the pancreas, was brought to my attention by experience at Bobs Roberts Hospital in Chicago in treating a patient who received 50,000 I. U. intramuscularly daily during fifteen days and subsequently every third day for six months. Periodical chest x-ray films never showed any improvement whatsoever.

May and others[4] have demonstrated that vitamin A when administered orally is not absorbed well by these patients. Experience led us to believe that parenterally administered vitamin was also not absorbed. This was confirmed in our patient by an absorption curve made following intramuscular injection of 10,000 I. U. of vitamin A per kilogram of body weight, which showed no rise whatever in the serum levels of vitamin A. No control data regarding absorption curves following parenteral administration of vitamin A in normal children have been found in the literature. A study of the absorption of vitamin A after intramuscular injection in children without abnormalities in digestion or fat metabolism was therefore undertaken.

Injectable vitamin A (1 c.c. — 50,000 I. U. in sesame oil)* was given in doses of 10,000 I. U. per kilogram of body weight. The same source of vitamin was used for both oral and parenteral tests. The material was injected into the muscles of the buttocks. Blood was obtained at the moment of the administration and three, six, nine, and twenty-four hours after parenteral injection, and after three and six hours when the vitamin was given orally. In some patients receiving the vitamin orally, only fasting and 6-hour specimens of blood were taken, since our chief object was to determine whether these patients had a normal absorption of vitamin A. The determination of the vitamin was made according to the method described by May, and associates.[4]

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*The vitamin preparation used in this study was made by Endo Products, Inc., Richmond Hill, N. Y.

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TABLE I. SERUM VITAMIN A AFTER ORAL ADMINISTRATION

NO.	DIAGNOSIS	AGE (YR.)	FASTING		3 HR. LATER		6 HR. LATER	
			CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.
1	Rheumatic fever	8	10.5	122			9.0	576
2	Ménière's syndrome	9	9.6	148			9.0	770
3	Poliomyelitis convalescent	7	15.3	155			16.0	614
4	Rheumatic fever	9	4.4	160			3.7	715
5	Rheumatic fever	6	10.2	154			9.8	549
6	Cerebral tumor	9	8.2	140	7.8	310	7.8	840
7	Upper respiratory infection	2	25.2	154	25.4	286	28.2	920

TABLE II. SERUM VITAMIN A AFTER INTRAMUSCULAR INJECTION

NO.	FASTING		3 HR. LATER		6 HR. LATER		9 HR. LATER		24 HR. LATER	
	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.	CAROTENE γ/100 C.C.	VITAMIN A I.U./100 C.C.
1	9.0	139	9.0	139	10.6	154	10.0	156	10.6	140
2	8.8	142	8.6	140	8.8	142	8.6	148	8.8	180
3	15.6	155	16.2	152	15.8	156	15.2	152	15.8	184
4	4.6	158	4.4	150	4.2	146	4.8		4.8	152
5	12.4	101	12.2	99	12.6	91	12.2	98		
6	7.8	180	8.0	192	8.6	178	7.8	178		
7	25.0	135	25.4	198	25.8	153	25.8	158		

As shown in Table I, all the patients who received vitamin A by the oral route experienced a marked rise in vitamin level after six hours when, according to May and associates,[4] the vitamin A concentration is at its highest level in the plasma. Table II shows that the vitamin was not utilized at all when given parenterally. In some patients the serum vitamin A concentration was assayed twenty-four hours after parenteral administration. This experiment was based on comparable tests performed in dogs by Clausen,[3] who found that when vitamin A was given intramuscularly, the highest level was obtained after twelve or twenty-four hours. In all our patients from whom we took blood after twenty-four hours, the vitamin concentration was approximately the same as at the beginning.

It is concluded that the parenteral administration of vitamin A fails to raise its concentration in the circulating blood.

SUMMARY

A comparison has been made between vitamin A absorption curves following oral and parenteral administration of the vitamin in seven children without digestive symptoms. In all cases the oral administration resulted in normal absorption, while the parenteral administration showed little or no evidence of absorption.

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LACUNAR SKULL OF THE NEWBORN INFANT

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LACUNAR skull is an anomaly of the skull of the newborn infant which is characterized by multiple defects of the inner table of the vault. The defects may be present in any part of the calvarium but most frequently occur in the parietal and frontal bones. They vary in size, shape, and number. At post-mortem examination of such a skull, the outer table is often found to be complete with the lacunae being present as shallow depressions of the inner part of the vault. Hartley and Burnett[1] called this craniolacunia in contradistinction to craniofenestria where the depressions are so deep that only a parchment-like membrane consisting of dura and periosteum is present. The distinction is not absolute, for some cases of craniolacunia show minor tendencies toward fenestration whereas some cases of craniofenestria have to a certain extent changes of the lacunar type. Some of the defect areas are often so large that the cranial contents may bulge through them. Lacunar skull is usually but not invariably associated with spina bifida, encephalocele, meningocele, or myelocele. Other congenital developmental anomalies such as deformities of the ribs and extremities, cleft palate, mongoloid facies, microcephalus, and craniostenosis may be present. Hydrocephalus often occurs and may be progressive.

In the German literature this condition is known under the names of Lückenschädel, Leistenschädel, and Blasenschädel.

HISTORY AND ETIOLOGY

The first cases of lacunar skull were described in the late nineteenth century. West,[2] an Englishman, in 1875 gave the first authentic case report. Engstler,[3] in 1905, reviewed the German literature on the subject. Kassowitz, in 1880, Wieland,[4] in 1909, Cohn,[5] in 1924, Faust,[6] in 1931, and Ottow,[7] in 1941, discussed the condition in extenso.

The first case in the American literature was reported by Markoe[8] in 1907. Other case reports followed by Kerr[10] in 1933, Maier[11] in 1934, Doub and Danzer[12] in 1934, Rothbart[13] in 1936, Shearer[9] in 1937, Dorrance[14] in 1940, and Bettinger[15] in 1942.

The etiology has been widely discussed. No entirely satisfactory explanation has been found. Some authors ascribed the condition to rickets.[4, 16] Various authors thought that it might be caused by increased intrauterine, intracranial pressure.[7, 15]

Rothbart[13] incriminated a primary disturbance in the development of the membranous bones of the cranium produced by ischemia, as well as an increase in intrauterine, intracranial pressure leading to pressure atrophy. Any condition permitting firmer contact between the brain and the skull produces ab-

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normal pressure on the inner vault. If there is also increased intracranial pressure, the atrophy will be more marked.

Hartley and Burnett[1, 17, 18] did not find any constant relation to diseases such as syphilis, rickets, or toxemia of pregnancy; nor the presence of any causative abnormal pressure effect either within or without the skull, before or during birth. They feel that the condition may be due to a developmental defect in which two processes are frequently associated, namely, the faulty ossification of the primitive membranous vault which surrounds the early brain, and the faulty chondrification of the vertebral bow of the primitive membranous spinal column which surrounds the early spinal cord. This may be due to an inherent defect of a chromosomal nature in which unhealthy mesodermal tissue is produced.

INCIDENCE

Vogt and Wyatt[19] reported on 6,000 skull examinations that were done on newborn infants of the Infants' and Children's Hospital in Boston. Craniolacunia occurred in 43 per cent of the 120 patients with meningocele. Two cases of true craniolacunia were found in over 5,000 cases without meningocele. Craniolacunia was least frequent in the presence of the smaller meningoceles and most frequent in association with the thoracic meningoceles. Its incidence in cases of meningocele was otherwise unaffected by the size or the location of the meningoceles. It was found more frequently in association with myelomeningocele than with simple meningocele.

Hartley and Burnett[1, 17] in Great Britain encountered twenty-eight cases in 3,828 newborn infants, giving an incidence of .94 per cent. Ten examples of craniolacunia were discovered in 232 radiographs of pregnant women, giving a radiological incidence of 4.3 per cent in antenatal cases (while in the material from which they collected, only three cases of craniostenosis were observed). Sixteen of the twenty-eight cases were primigravidas.

Ingraham and Scott,[20] in 1943, reported that the majority of their twenty patients with Arnold-Chiari malformation (this is a congenital malformation of the hind brain) showed craniolacunia.

DIAGNOSIS

Clinically, lacunar skull may be suspected, but the diagnosis usually rests on the roentgenographic appearance. There is a general diminution in thickness and delay in ossification in all of the flat bones of the skull as compared with the development of the skull of a normal infant. The sutures and fontanels may be widened. The most striking feature is the variation in density of the flat bone of the skull. Multiple areas of rarefaction are apparent, producing a "soap-bubble" or "honeycomb" effect. If there is only partial thinning, the diagnosis is more difficult. It can be differentiated from accentuated convolutional impressions due to markedly increased intracranial pressure as occurs in cases of craniostenosis, oxycephaly, scaphocephaly and brain tumor, by the contour of the skull which is more clearly demarcated in the latter. The lacunae are differently spaced than cerebral gyri and form a reticular, arborizing pattern.

The hydrocephalic skull at differential diagnosis must be approached with care. The less defined pattern of craniolacunia may be completely masked because the bones are thin and the cranial contents excessive. Craniolacunia can be differentiated from erosions caused by the granulations of Pacchioni, syphilitic perforations, cleidocranial dysostosis, Hand-Schüller-Christian disease, and craniotabes with little difficulty.

Hartley and Burnett[1, 17] discuss the advisability of antenatal radiological study, especially in cases of hydramnion or hydrocephalus, and also where the mother gives a history of previous stillbirths or previous children born with defects or deformities.

When craniolacunia is present, the shadow cast by the vault of the fetal skull becomes modified. Instead of being bounded by a smooth and regular margin of even density, interrupted only at the sutures, this margin becomes of variable thickness and density and of irregular shape. In some places it may be duplicated, while at others it may be completely defective so that the position of the sutures is lost and sometimes the suggestion of a reticular pattern may be seen in the vault bones. Often spinal deformities are seen in association with these changes (Brailsford[21, 22]).

It is emphasized by Hartley and Burnett that the diagnosis can only accurately be made in the lateral view by a study of the parietal areas, for in the frontal and occipital regions the bars invariably appear narrow and sharply defined because they are viewed tangentially. A feature which may contribute toward the diagnosis of craniofenestria occurs in those cases in which bulging of the cranial contents takes place through the fenestria. They suggest that many cases have escaped detection in the past because of the following reasons: (1) the failure of radiologists and obstetricians to realize the possibility of their antenatal recognition and to appreciate that they frequently occur in cases of spinal defect. This has meant that many infants have been sent for "x-ray of the spine" only and the skull has not been examined. (2) The association of hydrocephalus with craniolacunia has not been realized. Hence, few have considered it worth while having radiographs made, whether of living or, more particularly, of stillborn hydrocephalic infants. (3) There need be no clinical feature to suggest the necessity for radiological examination of the skull since the outer surface of the vault bones may be smooth, and the sutures and the fontanels may be normal.

PROGNOSIS AND THERAPY

The prognosis is dependent on the general state of health and associated defects. Usually the infant dies from progressively increasing hydrocephalus or intercurrent infection, especially meningitis. Some authors have the impression that there are cases in which the craniolacunae gradually become less prominent.[23]

The comparison of the clinical results of operation in cases of meningocele with and without craniolacunia was shown by Vogt and Wyatt.[19] It was evident that the patients with craniolacunia did more poorly than those without these lesions. Good results were obtained in only two patients (4 per cent) of

the group with craniolacunia; whereas, 17 patients (25 per cent) of the group without craniolacunia had good clinical outcomes. All of the patients in whom good results were obtained had simple meningoceles, with the exception of two, neither of whom had craniolacunia. Progressive hydrocephalus was one of the most serious complications encountered in patients with meningocele. It was present in 48 per cent of the patients with craniolacunia and in 25 per cent of the patients without this lesion.

Fig. 1.—Lateroposterior view of baby H on the second day of life.

CASE REPORT

Baby H. was delivered by cesarean section from a 40-year-old white primigravida with negative Wassermann. Cesarean section was performed because of a large uterine fibroid. An x-ray taken five weeks before delivery showed that the head of the fetus was enlarged. Increased lordosis was noted but was thought to be due to an excessive amount of amniotic fluid. The weight of the infant at birth was 7 pounds, 4 ounces; length, 19 inches; circumference of the chest was 13 inches with the anteroposterior diameter slightly increased. The head was very large, measuring 15 inches in the occipitofrontal plane. The cranial bones were floating and their outlines easily palpated. Fine ridges were felt in the cranial bones especially in the occipital and parietal region. Soft areas were palpated over the entire skull. Some of the gaps in the parietal bones were so large that one could feel the dura protrude

through them (Fig. 1). The baby had a normal cry and the color was good. There was a defect, measuring 4 by 6 cm., in the central portion of the thoracolumbar region. The defect appeared red in color and slightly depressed, and in its upper two-thirds was covered by a transparent membrane which was continuous with the skin of the back. A white, bandlike structure which was slightly expanded in the central portion was thought to represent the spinal cord. The defect described felt mushy on palpation. Motion of the left leg appeared definitely decreased from normal. The right leg showed no impairment of function. The Moro embrace reflex was present. No ankle clonus or any other pathological reflexes could be demonstrated.

Fig. 2.—Spine and skull after post-mortem exposure.

X-Ray Findings.—The cranial bones were extremely thin with thicker ridges running through them in a network, giving the appearance of multiple holes (Fig. 3). The suture lines were very wide. The spine showed congenital abnormalities, particularly in the lumbar area where several hemi-vertebrae were noted and a marked spread of the laminae was present, consistent with a very extensive spina bifida.

Subsequent Course.—The skull increased gradually in size. The protrusion of the dura through the defects in the skull became more marked. The lesion of the back, previously described, which was slightly depressed at birth, began to bulge by the second day and seepage of the spinal fluid was noted. The area became markedly ulcerated. The subsequent course was downhill. The seventh day diarrhea and regurgitation became prominent. Hyper-

pyrexia occurred at the ninth day, and the baby died on the eleventh day with convulsions and other signs of meningitis.

Autopsy Findings.— (Autopsy performed by Dr. Jesse B. Helfrich.) After the dissection of the scalp, the bony plates were seen and found to be extremely thin. Multiple defects, mostly oval-shaped, some of them surrounded by thick, sharp, bony ridges, others by thin, flat ones, were visible and only covered by a translucent membrane consisting of dura and peri-

Fig. 3.—X-ray of the skull on the first day of life.

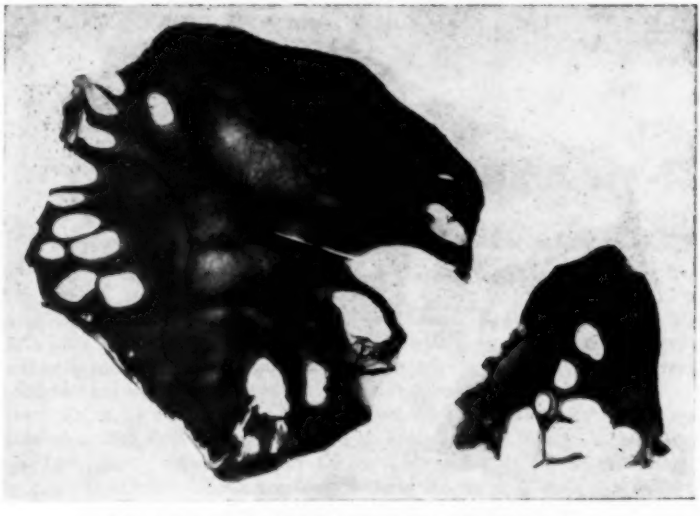

Fig. 4.—Transilluminated fragment of the dried skull.

osteum. There was a lacework of bony ridges visible at the interior aspect of the skull. The accompanying photographs are self-explanatory (Figs. 2 and 4).

After the brain was removed, a great amount of fluid escaped and the very thin brainy substance collapsed. Marked hydrocephalus was present. The choroid plexus was purple, covered with a purulent exudate.

In the middle of the back there was seen an oval area of necrotic skin through which the spinal fluid was exuding. The spinal fluid was light amber in color and purulent. After the skin of the dorsum was dissected away, the lower thoracic and all of the lumbar vertebrae were seen to be broadened. The spinal cord floated on the surface. It was yellowish in color and appeared infected. The chest and abdominal organs did not show any noteworthy changes.

SUMMARY

A case of craniolacunia of the newborn with spina bifida and meningomyelocele is discussed. A brief review of the literature is given.

Pictures were taken through the courtesy of Louis Lee and Robert C. Rieke.

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DISPLACEMENT OF THE MEDIASTINUM DUE TO PULSION BY A CASEOUS TUBERCULOUS LUNG WITHOUT PLEURAL EFFUSION

Report of a Case in an Infant

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IN A review of standard texts of physical diagnosis, clinical tuberculosis, roentgenology, and the available periodical literature no mention of mediastinal shift due to pulsion by a caseous lung without the presence of pleural effusion was found. Displacement of the mediastinum *toward* the affected side due to pulling of the mediastinum by adhesions and scars of the lungs and pleura in chronic tuberculous or nontuberculous infection is a well-known phenomenon.[1] Displacement may also be brought about by atelectasis from tuberculosis or other cause[2] or, on occasion, by an acute nontuberculous pneumonia.[3] Compensatory emphysema of the nondiseased lung in unilateral pulmonary infection may act as an agency in these mediastinal displacements.[4] In all these instances the displacement is toward the diseased lung.

Intrapulmonic disease processes capable of causing contralateral or pulsion displacement are tumor of the lung,[5] cystic malformations of the lung,[7] and unilateral emphysema.[8] Unilateral emphysemas not only may be compensatory, as mentioned, but also may be due to partial bronchial obstruction or have no discoverable cause.[8]

Several extrapulmonary causes of contralateral displacement of the mediastinum should be mentioned: pleural effusion, pneumothorax, unilateral diaphragmatic paralysis, and masses such as intrathoracic goiter or diaphragmatic hernia protruding into the chest cavity. The most frequent and most important cause of pulsion of the mediastinum is, of course, pleural effusion.

CLINICAL DATA

An 8-month-old mestizo boy entered the hospital with a complaint of "noisy breathing."

The present illness started about three months before admission with what the mother referred to as "asthma," characterized by heavy breathing but no cough. Fever then developed. The patient was treated in another hospital with sulfathiazole and was discharged after ten days improved. The mother was told that the infant had pneumonia of both lungs and pleurisy. Eight days after discharge, however, the symptoms recurred and persisted. Fifteen days before admission to this hospital he had developed swellings over the skin of the head and back. Ten days before admission, diarrhea and vomiting started and he began to cough. During this three months' period he lost much weight.

Physical examination showed a malnourished, slightly dehydrated, feverish, acutely and chronically ill baby lying in bed with his head retracted. Over the skin of the head, neck, and trunk were numerous dull red, fluctuant swellings about 1.0 cm. in diameter. The anterior fontanel was depressed. The neck was stiff. The alae nasi were dilated; breathing was labored and shallow. There was ballooning of the intercostal spaces on the left, and the left side of the chest was more expanded than the right. The apex beat of the heart was observed and felt in the costal angle. Percussion of the heart borders was not satisfactory but the heart beat was heard loudest over the sternum. There were no murmurs and the quality of the heart sounds was good. The entire left side of the chest was flat to percussion; breath

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sounds were absent over the entire left lung. The right side of the chest was normally resonant. There were no râles or abnormalities of breath sounds. Both the spleen and the liver were enlarged to three fingerbreadths below the costal margins. The abdomen was moderately distended but peristalsis was heard on auscultation. The reflexes were essentially normal.

Laboratory Data.—Urinalysis was negative except for 2 plus albumin. The stool was formed, yellow, and a preparation of unconcentrated specimen stained by Ziehl-Neelsen's technique showed many acid-fast bacilli. The blood contained 8 Gm. of hemoglobin per 100 c.c.; erythrocytes 2,750,000 per cubic millimeter; leucocytes 8,200 per cubic millimeter with neutrophiles 73 per cent and lymphocytes 27 per cent. No malaria parasites were present.

Roentgenogram of the chest on admission (Fig. 1) was reported as follows: "Massive pleural effusion, left, which displaces the heart and mediastinum to the right."

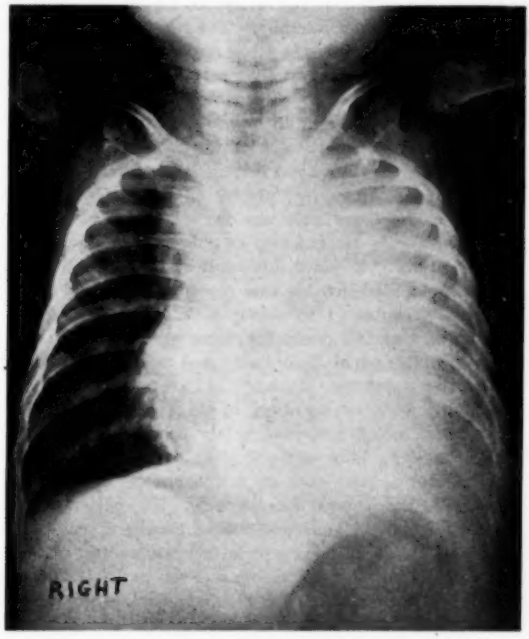

Fig. 1.—Note shift of the mediastinum to the right.

Course in the Hospital.—Thoracentesis of the left hemithorax was done on the day of admission. There was no ready flow of fluid through the needle. On exerting negative pressure, however, about 0.5 c.c. of thick, white, caseous material was withdrawn. This material showed a myriad of acid-fast bacilli on smear but was free of other organisms both by smear and culture; only a few cells were present, all monocytes. A lumbar puncture yielded clear fluid with normal dynamics. Pandy's test showed increased globulin but only one lymphocyte per cubic centimeter was present; no pellicle formed on standing. The patient ran a steadily downhill course, with an irregular, intermittent fever between 99 and 103° F. and died a week after admission.

AUTOPSY FINDINGS

Complete autopsy was done eighteen hours after death. The anatomic diagnoses included:

1. Lobar pneumonia, tuberculous, left lung, with marked enlargement and with extensive diffuse caseation necrosis of practically the entire organ.

2. Tuberculous pleuritis, left, with obliteration of left pleural cavity.
3. Mediastinal shift to the right, pulsion in type, due to enlargement of the left lung.
4. Bronchopneumonia, right lung, tuberculous, slight, with caseation necrosis.
5. Tuberculosis, caseous, of cervical, mediastinal, and abdominal lymph nodes.
6. Tuberculous ulcers of ileum, cecum, and colon.
7. Multiple tubercles of liver, spleen, and kidneys.
8. Tuberculosis of right middle and inner ears with involvement of petrous portion of right temporal bone.
9. Pyogenic abscesses of skin, *Streptococcus hemolyticus*.
10. Emaciation.

Detailed description may be limited to the thorax. Upon removal of the anterior thoracic wall it was observed immediately that the trachea, heart, and mediastinum were shifted to the right. The apex of the heart was in the fifth interspace 2.0 cm. to the left of the midsternal line and pointed downward rather than laterally. The right border of the heart was located 3.0 cm. to the right of the midsternal line. In other respects the organ was not remarkable.

The left pleural cavity was completely obliterated by dense fibrous adhesions between the visceral and parietal surfaces; *no free fluid was present*. The left lung was markedly enlarged, weighing 400 grams (normal weight 45 grams[9]). This enlargement had distended the left hemithorax and had caused a displacement of the mediastinum to the right. Upon external examination the entire organ was firm, tense, and apparently completely consolidated. Prominent rib markings or indentations were present on the surface of the lung. Sectioning revealed that virtually the entire parenchyma was one solid mass of white or yellowish white, nonaerated, caseous material hardly recognizable as pulmonary tissue. Only at the apex was there a small amount of parenchyma which, although consolidated, had not been completely destroyed by caseation necrosis. No cavities were present.

The right pleural cavity contained 10 c.c. of pink fluid. Only a few flimsy adhesions were present between the visceral and parietal pleurae at the apex of the right lung. The right lung weighed 120 grams (normal 52 grams[9]) and was not atelectatic. Scattered uniformly in all lobes were tiny tubercles. In addition, areas of caseation necrosis averaging 1.5 cm. in their greatest dimension were present in the upper and middle lobes. The intervening soft pink parenchyma occupied approximately one-half of the lung. There was no fibrotic process of either the right lung or right pleura which conceivably could have drawn the mediastinum to the right.

Much of the mucosa of the bronchi was necrotic. The peritracheal and peribronchial lymph nodes were markedly enlarged and consisted of masses of caseous material contained within thin, tense capsules. One such node was in intimate contact with the left main stem bronchus at the site of necrosis both of the mucosa and the wall. It appeared likely that rupture of caseous material into the bronchus may have occurred in this area.

MICROSCOPIC EXAMINATIONS

Several sections of the left lung were similar. The pleura was widened by fibrosis and infiltrated by lymphocytes and epithelioid cells, but no well-defined tubercles or giant cells were present. Within the parenchyma proper the histologic changes were so extensive that the tissue could scarcely be recognized as lung. In large areas the alveolar architecture was completely obscured and represented merely by zones of confluent, early caseation necrosis. Here and there, however, could be recognized a few pulmonic alveoli, the lumina of which were filled with fibrinopurulent or caseous exudate. Some of the caseous zones appeared to have undergone dissolution with the formation of irregular spaces. Nowhere were found well-defined tubercles with epithelioid rims and giant cells. It was felt that the lesion of the left lung was a tuberculous pneumonia showing no resolution but conversion into caseous parenchyma.

Scattered within the pulmonary parenchyma of the right lung were many small patches of caseation necrosis. The intervening parenchyma contained alveoli filled with serous or purulent exudate in which many mononuclear cells were present. As in the right lung, no well-formed tubercles were seen and giant cells were absent. Much of the mucosa of the

bronchi and bronchioles was necrotic and their lumina contained purulent or caseopurulent material. In smears of both lungs and of the lymph nodes a large number of acid-fast bacilli morphologically similar to tubercle bacilli were present.

DISCUSSION

The chief interest in this case lies in the similarity of the clinical and roentgenologic findings with those of pleurisy with effusion. Flatness to percussion, absence of breath sounds over the entire left side of the chest, and displacement of the heart to the right were considered diagnostic of effusion in the left pleural cavity. Furthermore, the left intercostal spaces bulged and the left side of the chest was splinted and fixed in a way usually characteristic of fluid. The roentgenogram showed homogeneous opacity over the entire left side of the chest with the heart and trachea shifted to the right. This seemed to confirm the clinical diagnosis of effusion.

It is questionable if the differential diagnosis could have been made before the thoracentesis. Grocco's triangle of dullness might have been a helpful sign in an older patient but is of little, if any, value in infants. Major states "the 'feel' on percussion and the note obtained (in pleural effusion) are different from the dullness obtained in consolidation of the lung."[6] No difference was detected in this case. The almost complete absence of air-containing alveoli produced an absolute dullness or flatness indistinguishable from the percussion note over massive effusion.

After the thoracentesis it was clear that some condition was present other than simple tuberculous pleurisy with effusion. The failure to obtain a free flow of fluid and the recovery of a small amount of tuberculous caseous material on suction indicated that either a caseous empyema was present or the needle was in the lung. Of these two possibilities, the first seemed the more likely in view of the mediastinal shift. Only after the thorax was opened post mortem was the actual situation correctly evaluated.

SUMMARY

A case of pulmonary tuberculosis in an infant is presented in which the caseous lung enlarged sufficiently to displace the mediastinum toward the other side. The clinical and roentgenologic findings closely resembled those of pleurisy with effusion.

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AGENESIS OF THE LUNG

Case Report

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Medical Corps, Army of the United States

CONGENITAL failure of development of one or several lobes of the lung is a rare anomaly. Unless complications arise as a result either of other anomalies or of other diseases few cases are diagnosed prior to death, for their courses may be symptomless.

CASE REPORT

An 8-month-old white female was seen in the Out-Patient Clinic on March 30, 1945.

The baby was born of normal parents on Aug. 7, 1944. Delivery was uneventful, and the child cried spontaneously without any respiratory embarrassment. Growth and development occurred normally without signs of respiratory difficulty or feeding disturbances.

The baby was brought in because of fever and anorexia of twenty-four hours' duration. Physical examination revealed the following salient features: The temperature was 103° F.; pulse, 110; and respirations, 28. The child's throat and tonsils were red, nose congested, and both eardrums injected. Examination of the chest presented the most striking signs. The entire left side including the usual cardiac area was hyperresonant to percussion, and breath sounds were exaggerated. Conversely, on the right, percussion was impaired and breath sounds suppressed. The apex beat could be palpated in the fourth interspace just to the right of the sternum. Cardiac sounds were best heard on the right side of the chest. No abnormal heart tones or murmurs could be elicited. The remainder of the physical examination revealed no abnormalities.

Following recovery from the upper respiratory infection, the child appeared well. Chest signs remained unchanged.

X-ray examination of the chest confirmed the physical findings. The left lobes appeared unusually clear, probably as a result of compensatory emphysema. The heart seemed to occupy most of the right chest. Very little lung could be discerned on the right side. Intercostal spaces were wider on the left. By fluoroscopy it could be seen that the heart was shifted over to the right without apparent rotation. Barium mixture given by mouth indicated that the esophagus was displaced to the right. Both diaphragms were mobile with much greater excursions on the left. (Figs. 1 and 2.) X-rays of the remainder of the skeletal system revealed fusion of the eighth and ninth dorsal vertebra and lumbarization of the first sacral segment.

Electrocardiograms revealed the following: A sinus tachycardia was present. Deep waves measuring up to 15 mm. in depth occurred in Leads I and II. R waves measured 17 mm. in these leads. A small S_3 was present. All P and T waves were normal and upright. There was no evidence of a true congenital dextrocardia.

Bronchoscopy was accomplished by Dr. G. B. Ferguson. Increased secretions and poor tolerance of the child to the procedure did not permit a clear picture of the situation through the bronchoscope. However, as a result of the entrapment of air both the trachea and left bronchus could be clearly visualized by x-ray. The right bronchus could not be seen.

From the Medical Service, Station Hospital, Seymour Johnson Field.

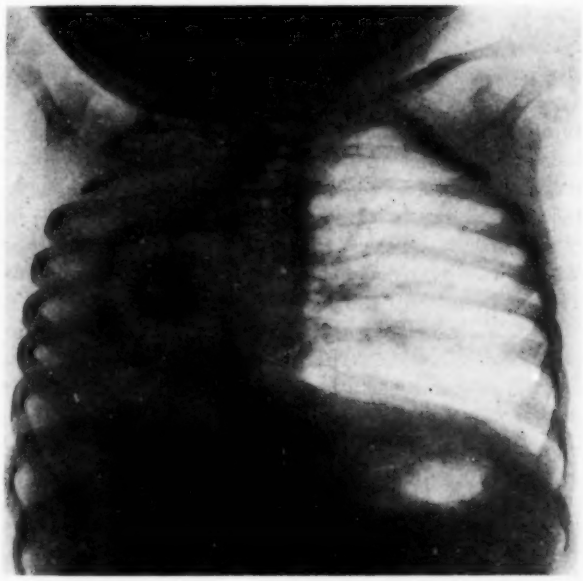

Fig. 1.—X-ray chest in upright position. (Positive film.) (Official photograph, U. S. Army Air Forces.)

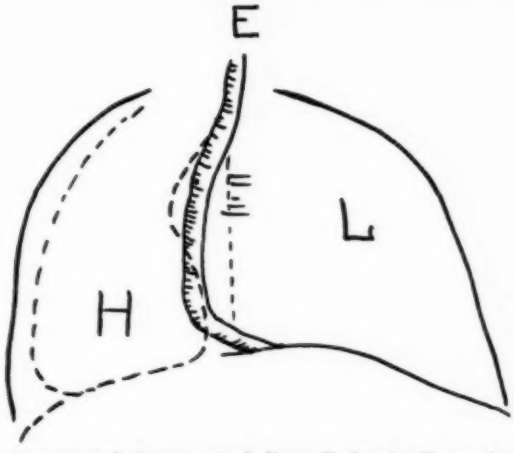

Fig. 2.—Diagram of x-ray and fluoroscopy findings *H*, heart; *E*, esophagus; *L*, left lung. (Official photostat, U. S. Army Air Forces.)

COMMENT

Reviews on the subject have been presented by Killingsworth and Hibbs[1] and later by Valle and Graham.[2] A total of forty-one cases has been recorded. Of these, twelve patients were over 19 years, and four ranged from 41 to 72 years in age. Only four cases were diagnosed during life. In previous cases the left lung was affected twice as often as the right. The anomaly varied from complete aplasia with absence of the bronchus and vascular supply to hypoplasia of the lung associated with a bronchus reduced in size. Mediastinal structures were displaced toward the involved side, and the remaining lung underwent compensatory emphysema. Other congenital anomalies were frequently present. In uncomplicated cases symptoms ranged from lack of complaints to dyspnea, cyanosis, stertorous breathing, and/or developmental failure. In many patients difficulties arose from associated anomalies or from pulmonary infections such as pneumonia or bronchiectasis. The physical signs and x-rays were often mistaken for massive or fetal atelectasis. The final diagnosis can be made only by exploratory thoracotomy.

In this case, the diagnosis of agenesis of the right lung was made from the clinical picture and the radiographic studies, which agreed with the description by Caffey.[3] The lack of respiratory tract symptoms and the absence of asphyxia at birth indicated that in the prenatal period an anomaly of the right lung developed and was compensated by hypertrophy of the remaining pulmonary tissue.

SUMMARY

A case of agenesis of the right lung in an 8-month-old infant is reported. The diagnosis was made during life and was based upon the lack of respiratory symptoms associated with extremely abnormal radiographic findings in the chest.

The authors are grateful to Dr. G. B. Ferguson of the McPherson and Duke Hospitals, Durham, North Carolina, for assistance in study of this case.

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ATELECTASIS OF THE NEWBORN: TREATMENT BY BRONCHOSCOPIC DRAINAGE

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ATELECTASIS of the newborn has always been a serious condition and one which has been very difficult to treat. Unfortunately the usual conservative measures in treatment are often inadequate, and the infant frequently expires of exhaustion.

We wish to present the procedure of bronchoscopic aspiration as an adjunct in the treatment of severe cases of congenital atelectasis due to obstruction of the bronchi with body secretions. Working independently, we have performed this procedure on twenty-three infants, and we feel the results have been quite gratifying.

Woodward and Waddell[1] presented five cases of atelectasis in newborn infants and cited seventeen other cases of Dr. Maurice G. Buckles that were treated by bronchoscopic aspiration. This article stimulated the interest of pediatricians in our locality, so that we have been asked to perform bronchoscopy on twenty-three patients who had not responded to conservative therapy and in which exhaustion of the infant seemed inevitable.

According to Brennemann,[2] in intrauterine life the child's lungs are atelectatic. Twenty minutes after birth there is a 17 c.c. air capacity, and from three to six hours after birth the capacity is about 36 c.c. Normally it is several days before the lungs have completely expanded. This expansion becomes complete first in the anterior borders and apices. The paravertebral, central, and posterior portions are the slowest to expand.

Wilson and Farber[3] feel lack of expansion in premature infants is not a failure of respiratory effort in many instances, although this may be weak, but that it is due to cohesion of moist surfaces of the air passages. This condition may, of course, be emphasized by any disturbance in the respiratory center, imperfectly developed thoracic mechanism, or through obstruction of bronchi by aspiration of amniotic fluid, mucus, or blood.

Patterson and Farr[4] present strong evidence in support of the hypothesis that the human fetal respiratory tract is not inert in utero, but is subject to rhythmic respiratory movements, during which there is a tidal flow of amniotic fluid through the bronchial tree and alveoli. Examination of lung secretions in cases of neonatal deaths, some in stillborn infants, showed amniotic fluid present. That this is not entirely due to passage through the birth canal, as is generally thought, is shown by the fact that some of these infants were delivered by cesarean section. Snyder and Rosenfeld[5] showed that India ink injected into the amniotic sac is followed shortly by the appearance of this material in the pulmonary alveoli of the animal fetus.

To date we have used bronchoscopy in twenty-three cases with eight deaths, representing a mortality of 34.7 per cent. In these eight cases that ended un-

favorably, the diagnosis of true congenital atelectasis due to bronchial obstruction was not established with certainty prior to bronchoscopy. With some hesitancy, however, the cases were bronchoscoped only to reveal little bronchial secretion. Subsequent post-mortem examination revealed that only two of the eight deaths were due to true atelectasis and the remaining six cases were found to include cerebral hemorrhage, congenital aplasia of the brain, diaphragmatic hernia, pneumonia, congenital heart and massive patchy atelectasis not due to bronchial obstruction. The corrected mortality rate, after these complications were eliminated, would be two deaths in seventeen cases of true atelectasis, or 11.7 per cent.

In view of our experience in these instances, we feel it is imperative prior to bronchoscopy to rule out by every means at our disposal the various pathologic entities that may resemble congenital atelectasis due to bronchial obstruction. These include asphyxia, congenital disease of the heart and blood vessels, congenital cystic lung, cerebral trauma, blood dyscrasia, pulmonary infection, diaphragmatic hernia, and congenital fetal atelectasis.

Careful examination of the infant's respiratory rate and rhythm will aid in eliminating distress due to cerebral injury.

X-ray studies should be made prior to bronchoscopy in all cases. This, together with physical examination of the child, will aid in eliminating congenital heart, congenital cystic lungs, diaphragmatic hernia, pulmonary infection, and congenital fetal atelectasis due to patchy, nondeveloped lung areas.

Bronchoscopic aspiration is indicated in any case of congenital atelectasis due to bronchial obstruction which has failed to respond to the usual methods of conservative treatment. It is not advisable to wait for signs of exhaustion before bronchoscopy is performed. The interval of time that it is safe to wait obviously depends on the extent of the atelectasis and the infant's physical condition. Most of these cases are encountered in premature infants whose reserve stamina is, indeed, very limited.

In all cases, some secretions have been aspirated from the bronchial tree. However, in only one case was a definite thick, stringy plug of exudate removed from a single bronchus. If cohesion of surfaces tends to promote atelectasis, perhaps instrumentation helps to relieve this condition.

Following bronchoscopic aspiration there is usually a progressive improvement in the infant's respiration. However, complete relief most frequently occurs from six to eight hours after instrumentation. This is apparently due to removal of secretions from the larger bronchi allowing the smaller terminal branches to drain.

The classical picture of congenital atelectasis secondary to bronchial obstruction is herein presented:

1. Progressive dyspnea with cyanosis, most marked after crying or other effort. This may often be temporarily relieved with oxygen. When these symptoms are not present, listlessness and pallor are usually noticed.

2. Suprasternal retraction with diaphragmatic tug on the lower ribs and diminished thoracic expansion on one or both sides, associated with suppressed breath sounds with or without percussion dullness.

3. Coarse inspiratory râles and areas of localized emphysema. *Coarse moist râles are an important finding and are usually absent in cases not due* to obstruction from body secretions.

4. Dehydration.

5. X-ray of the chest will usually show a rather complete atelectasis of one or more lobes. An x-ray should be made when possible in every case, but the diagnosis is made primarily on the clinical picture.

Congenital atelectasis most commonly occurs in premature infants. In our series, nineteen of the twenty-three cases bronchoscoped were in this category, representing 82.6 per cent. The smallest infant treated was a twin weighing 4 pounds, 4 ounces. Another, weighing 4 pounds, 7 ounces and seven weeks' premature, was likewise bronchoscoped, and in both instances the infants went on to normal development.

The procedure of bronchoscopy seems to produce little, if any, shock to these babies. Likewise, laryngeal edema does not develop secondary to instrumentation. This is due to two factors. First, the length of time consumed in the procedure is less than four minutes. Second, the type of bronchoscope used produces little trauma to the glottic chink.

The bronchoscope used in our series is the new, improved 3 mm. bronchoscope as devised by Dr. Simon Jesberg, of Los Angeles, and described by him in the 1941 *Archives of Otolaryngology*.[6] The Jesberg bronchoscope has the same inside diameter, but the outside diameter is one millimeter smaller than the standard 3 mm. bronchoscope usually used, measuring 4.5 mm. by 5 mm. This millimeter is gained by using a smaller light carrier and light bulb. The tip of the bronchoscope is likewise much smaller than the standard bronchoscope. Consequently, this instrument passes with little difficulty through the smallest glottic chink and subsequent laryngeal edema or shock is prevented.

CONCLUSIONS

1. The etiology of atelectasis of the newborn is not fully understood.

2. Selected cases of congenital atelectasis secondary to bronchial obstruction, which fail to respond to conservative treatment, are materially benefited by bronchoscopic aspiration.

3. Bronchoscopic aspiration of the newborn infant is relatively a benign procedure when properly performed.

4. The improved 3 mm. Jesberg bronchoscope is strongly recommended for use in these cases.

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LISTERELLA MENINGITIS

Report of a Case With Recovery

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Listerella monocytogenes is a rare pathogen for man. A review of the literature showed it to be extremely rare as a cause of meningitis in infancy. Burn[1] (1936) reported three fatal cases of *Listerella* infection in infancy, one of which at autopsy revealed extensive suppurative meningitis. Carey[2] (1936) reported a case of acute meningitis caused by *L. monocytogenes* in a small child with recovery. Poston, Upchurch, and Booth[3] (1937) reported a fatal case in a 3-year-old child. In 1939 Porter and Hale[4] mentioned an unpublished case of a small boy with *Listerella meningitis* treated successfully with sulfanilamide. Wright and MacGregor[5] (1939) reported a fatal case of *L. meningitis* in a 17-month-old infant. A complete review of the literature on listerellosis has recently been published by Kaplan[6] (1945).

We wish to report a case in an infant treated with sulfadiazine and penicillin with recovery.

CASE REPORT

History.—W. L. R., a 6-week-old male infant from Defoe, Ky., was admitted to the Children's Free Hospital of Louisville, Ky., on April 26, 1945. The chief complaints were fever and irritability. The infant was in excellent health until the morning prior to admission at which time he became irritable with a fretful cry; later in the day he developed fever. No vomiting, diarrhea, cold, or cough were noticed. The child lived on a farm. The livestock consisted of chickens, swine, and cows. The parents stated that the animals were in excellent health at the present and there was never any disease prevalent in the stock. The past history and family history were noncontributory.

Physical Examination.—The patient was an acutely ill, irritable male infant in constant motion and crying continuously; the rectal temperature was 103.4° F. The skin was hot and dry with a few vesicular and pustular lesions over the face. The anterior fontanel measured 4 cm. by 4 cm. and was quite tense and bulging. Aside from this there were no signs of meningeal irritation. The lips were cherry red and dry. The reflexes were normal.

Laboratory Findings.—Lumbar puncture on admission revealed a cloudy spinal fluid under normal pressure with immediate formation of fibrin strands. The white cell count of the spinal fluid was 7,400 per cubic millimeter with 94 per cent polymorphonuclear leucocytes and 6 per cent lymphocytes; globulin was 3 plus, and sugar was under 30 mg. per cent.

On primary smear a gram-positive rod was seen which grew on culture and was subsequently identified as morphologically resembling *L. monocytogenes.* A blood culture obtained on the day of admission revealed *Bact. alkalegenes* which was thought to be a contaminant.

A repeat lumbar puncture on the second and third days again revealed on smear and culture a gram-positive rod. Four subsequent lumbar punctures were all negative on both

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smear and culture. The spinal fluid white blood cell count, sugar, and protein gradually returned to normal.

The white blood cell count was 21,000 per cubic millimeter on admission, 14,000 per cubic millimeter on the thirteenth day and 16,000 per cubic millimeter on the fifty-fourth hospital day (three days prior to discharge). A red blood cell count was 3,850,000 per cubic millimeter on admission, 2,540,000 per cubic millimeter on the eighth hospital day and 3,800,000 per cubic millimeter on the fifty-fourth hospital day. The hemoglobin was 12.5 Gm. per 100 c.c. of blood on admission and the same on the fifty-fourth hospital day. Blood sulfadiazine levels ranged from 7.8 mg. per cent to 25.8 mg. per cent during the first week of hospitalization. The initial urinalysis revealed 4 plus albumin, but all subsequent urinalyses were negative. The blood Kahn and tuberculin tests were negative.

Treatment.—The infant was immediately given 10,000 units of penicillin intrathecally and 15,000 units intramuscularly. This was followed by 5,000 units of penicillin every three hours intramuscularly. The following day another 10,000 units was given intrathecally and the intramuscular penicillin was increased to 10,000 units every three hours, and on May 12 it was discontinued. The total amount of penicillin administered was 20,000 units intrathecally and 1,100,000 units intramuscularly. An initial dose of 20 c.c. of a 5 per cent sodium sulfadiazine solution was given subcutaneously followed by 100 c.c. of M/6 sodium lactate. This was followed by 15 c.c. of a 5 per cent sodium sulfadiazine solution every eight hours. A continuous intravenous infusion was started with 5 per cent glucose in distilled water. At the end of thirty-six hours this was discontinued and separate infusions were given intravenously and subcutaneously as needed to maintain body hydration. On May 2 the sulfadiazine administration was changed to the oral route, 0.25 Gm. every four hours for one week. Due to an upper respiratory infection the sulfadiazine was resumed May 17, 0.125 Gm. being administered every four hours for three days. On June 8, 1945, the child developed bronchopneumonia for which sulfadiazine, 0.125 Gm. every three hours, was given for five days, and penicillin, 5,000 units every three hours, was given intramuscularly for six days (total of 240,000 units).

Supportive therapy consisted of oxygen during the first week and repeated transfusions of blood and plasma as indicated during his hospital stay.

Course.—During the first week of hospitalization the infant was acutely ill with a temperature ranging from 98.6° F. to 105.2° F. The second week of illness the infant's febrile course subsided. At the end of the second week and the beginning of the third week the child cried constantly and required considerable sedation. Following this the course was uneventful except for an upper respiratory infection and bronchopneumonia of moderate severity. Both were adequately cared for by the chemotherapy.

During the first two weeks the child's weight dropped from 11 pounds, 9 ounces, on admission to 10 pounds, 14½ ounces. Following this the weight gradually increased to 13 pounds, 3 ounces, on the day of discharge, June 21, 1945, fifty-seven days after admission.

There were no apparent neurological changes; the child was bright, had normal reflexes, and was apparently in excellent health on discharge.

BACTERIOLOGY

The spinal fluid was streaked on blood agar and inoculated into Douglas broth and ascitic fluid agar. Growth appeared on all three of these media.*

Morphology.—The organism, isolated in pure culture from the spinal fluid, appeared as a small gram-positive rod. The average size was 0.5 by 1 to 2 microns but occasional larger forms were seen. In smears made from eighteen-hour broth cultures, the organisms were irregularly arranged except for a tendency toward parallel arrangement. Motility was evident in eighteen- to twenty-four-hour cultures. There was no evidence of branching or clubbing on any media. The organism was nonacid-fast and failed to produce spores. There was no evidence of encapsulation.

*Original smears and isolations were made by Miss Anne Butorff, Bacteriologist in the Louisville General Hospital, Bacteriological and Serological Laboratories, Dr. James A. Kennedy, Director.

Cultural.—Growth was evident within twenty-four hours under aerobic conditions on both plain nutrient agar and blood agar. Forty-eight-hour colonies on blood agar were round, 1 mm. in diameter, and were surrounded by a definite zone of hemolysis.

Biochemical.—Acid, but no gas, was produced in glucose, salicin, and rhamnose within twenty-four hours. Similar reactions were produced more slowly in lactose, maltose, sucrose, dextrin, and galactose. There was neither fermentation of mannite, inulin, nor xylose. Tests for indole and hydrogen sulfide were uniformly negative.

Pathogenicity.—The organism was distinctly pathogenic for rabbits and mice. Intravenous injections of 0.5 c.c. of an eighteen-hour broth culture produced death within forty-eight hours in each of four rabbits injected. Intraperitoneal injections of 0.25 c.c. also produced death within forty-eight hours in two mice. One mouse and two rabbits were studied after death and pure cultures of the organism were isolated from the heart blood, lungs, liver, and spleen of each animal.

*Histopathologic Sections Revealed.**—

Heart: Severe cloudy swelling only.

Lungs: Large portions of the lungs were consolidated by exudate consisting chiefly of serous fluid and a very small amount of blood. The bronchioles contained similar material and in some of them the epithelium was sloughing. There was an intense congestion; possibly this slight diffuse hemorrhage was chiefly secondary to the congestion. The leucocyte response was minimal and consisted of neutrophiles and monocytes. There was no focal necrosis. There were numerous emphysematous blebs at the periphery.

Liver: There were great numbers of microscopic abscesses in various locations of the lobule. Necrosis was of the liquefaction type. The leucocyte response was chiefly neutrophilic; a great proportion of the cells were fragmented. There was no evidence of repair.

Spleen: The spleen was very badly damaged by serous exudate similar to that in the lung. There was much blood pigment in the reticulum. The cells were vacuolated and swollen so that the architecture was markedly distorted. Leucocytic infiltration was minimal and consisted of monocytes and neutrophiles. The general appearance of the spleen suggested that it was necrotic.

Kidneys: Marked cloudy swelling only.

Lymph Nodes: The lymph nodes were badly damaged by abscesses similar to those in the liver except that there were more monocytes in the lymph nodes and a few giant cells.

Pancreas: Marked cloudy swelling.

Interpretation.—

1. Bronchopneumonia with emphysema
2. Multiple abscesses of lungs
3. Acute splenic tumor, marked
4. Suppurative lymphadenitis
5. Marked cloudy swelling of all viscera

Resistance to Penicillin.—In vitro tests for penicillin susceptibility were made similar to those reported by Foley, Epstein and Lee[7] (1944). Serial dilutions of a commercially prepared extract of penicillin were made in 5 c.c. lots of sterile peptone water. Twenty-four-hour peptone water cultures of the gram-positive rods under study were diluted 1 to 10 with sterile 0.85 per cent sodium chloride solution. Similar dilutions were made of a twenty-four-hour peptone water culture of *Staphylococcus aureus* (previously tested for penicillin susceptibility). Dilutions of the penicillin in the peptone water (5 c.c. amounts) were inoculated with .05 c.c. of either *Staph. aureus* or the gram-positive rods isolated from the case herein reported.

The following results were recorded after twenty-four hours' incubation at 37° C. Only 0.02 unit per cubic centimeter were necessary to inhibit the growth of the *Staph. aureus*, while from 0.3 to 0.4 unit per cubic centimeter were necessary to inhibit the growth of the gram-positive rods. The in vitro resistance of these gram-positive rods to penicillin may, therefore, be estimated as from fifteen to twenty times greater than the resistance of the *Staph. aureus* strain.

*Dr. A. J. Miller, Department of Pathology.

SUMMARY OF BACTERIOLOGY

Based on these reactions, this organism appears to be similar to *L. monocytogenes* as described by Topley and Wilson[8] (1936) in the second edition of their textbook. It is also similar to the organism described by Webb[9] (1943). It differs from other reported reactions of strains studied by Webb (1943) in fermentation of galactose and from Bergey's[10] (1939) description in its failure to ferment xylose. The organism's susceptibility to penicillin was approximately twice that reported by Foley, Epstein, and Lee[7] (1944) for *Listerella* strains, but still approximately twenty times as resistant as was the *Staph. aureus* strain. However, it seems logical to conclude that the organism isolated from this patient's spinal fluid was a strain of *L. monocytogenes.*

DISCUSSION

Porter and Hale[4] reported in 1939 that seventy-seven of eighty control mice infected with *Listerella* died, while fourteen of sixty treated with sulfanilamide died, and only two of twenty treated with sulfapyridine died. Foley, Epstein, and Lee[7] in 1944 reported their results of experiments with several strains of *L. monocytogenes.* In comparison to other gram-positive organisms they found that *Listerella* grew freely in forty times the concentration of penicillin necessary to inhibit completely the growth of certain gram-positive organisms studied. In our studies we found the organism from fifteen to twenty times as resistant to penicillin as is the *Staph. aureus* (see section on bacteriology). It appears, therefore, that penicillin is not a potent bacteriostatic agent for this organism. In all probability the effective agent in the treatment of this case was sulfadiazine.

CONCLUSION

A case of meningitis in an infant caused by *L. monocytogenes* and treated with sulfadiazine and penicillin with recovery is herein reported.

Sulfadiazine may be the drug of choice in the treatment of *Listerella* infection but further studies will have to be made to reveal its value as a chemotherapeutic agent in the treatment of listerellosis.

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CONGENITAL ECTODERMAL DEFECT

Report of an Unusual Case Involving Scalp and Leg

J. Lamar Callaway, M.D., Ray O. Noojin, M.D., Kathleen A. Riley, M.D., and Beatrice H. Kuhn, M.D.
Durham, N. C.

ACCORDING to Anderson and Novy,[1] they made the first report in the American dermatologic literature in 1942 on congenital ectodermal defects of the scalp. They present four cases and an excellent review of the literature.

Ingalls,[2] in 1933, gave a complete report on the study of sixty cases regarding the pathology of development of congenital ectodermal defects of the scalp.

There are many theories of etiologic cause including amniotic adhesions, hereditary factors, arrested development, intrauterine healing of angioma, pressure necrosis of the extremities and of the scalp during labor. Ingalls, in his discussion of etiologic factors, states that there is a total lack of any evidence pointing to amniotic influences, except for one reported case. He believes the cause to be on a basis of inherent fundamental factors, which impress upon the midline of the head with a degree of sensitivity or vulnerability equaled perhaps nowhere else on the body. The investigations, clinical findings, and opinions of other authors generally agree with his.

Clinical characteristics are relatively consistent. The majority of the lesions are single and usually located in or near the midline and most commonly on the vertex. The size of the lesion averages 1 to 2 cm. and the largest reported lesion measured 60 sq. cm. The lesions are usually oval in configuration, only occasionally elongated or irregular. In a majority of cases only the epidermis and the subcutaneous tissues were involved. The lesion may extend to the dura, pericranium or glia. The gross features show considerable variations but are usually described as having sharp punched-out margins, with the lesion itself consisting of scarlike tissue. At first a dry translucent membrane covers the area and later breaks down leaving granulation tissue. Despite occasional variations in gross appearance, the absence of hair tends to be a consistent feature.

Eight per cent of the cases reported have been associated with a congenital defect elsewhere.[2]

The diagnosis is based on the aforementioned criteria being present at birth. In the differential diagnosis criminal injury, forcep injury, primary syphilis, and congenital depression of the skull are to be considered.

Prognosis is less favorable for scalp defects than for ectodermal defects elsewhere because of the danger of increased injury to the lesion during delivery. There has been a 20 per cent mortality rate with most of the deaths at least partially referable to the lesion on the scalp.[2]

From the Division of Dermatology and Syphilology of the Department of Medicine, Duke University School of Medicine.

Fig. 1.

Fig. 2.

There seems to be no treatment indicated except the prevention of trauma and secondary infection by the use of local bland therapy.

REPORT OF A CASE

B. C., female aged 3 weeks, was first seen April 6, 1945, because of a lesion on the scalp and left leg. The mother and father had negative Wassermann serologic reactions on their peripheral blood. No history of development of abnormalities in the offspring of either maternal or paternal families could be obtained. The labor of the mother and the delivery of the child, without forceps, were normal. The infant was normal in every way except for the skin lesions.

On examination there was present a lesion on the right vertex, which was 8 by 6 cm. in size (Fig. 1). The lesion was covered by a transparent membrane. Scar tissue was present along the borders of the affected area. The left leg showed a similar lesion that formed an encircling band about the ankle, 3 cm. in width (Fig. 2). Both lesions showed atrophy, especially on the ankle where there was some deformity due to fibrosis and scarring. The lesions were treated with a simple boric acid ointment plus massage to the left ankle. One month after the child was first seen, the lesions showed signs of regression with the formation of more scar tissue and only slight deformity of the left ankle.

SUMMARY

A case of congenital ectodermal defect of the scalp is presented. The scalp lesion is typical clinically of the majority of cases previously described. However, the ankle lesion, unlike most ectodermal defects, is not symmetrical and is associated with a decided deformity due to scar tissue formation.

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American Academy of Pediatrics

Proceedings

FOURTEENTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

BOOK-CADILLAC HOTEL, DETROIT, MICH.
JAN. 15-18, 1946

Report of the Secretary

The rate of increase in the number of Academy members continues and with it naturally an increase in work in the Secretary's office. The South American Division, Region V, has not been quite so active as it was previously, probably due to the action of the Executive Board at its last meeting to increase their dues.

Largely, the Academy has been interested in the proposed Federal Legislation and has voiced a very heavy majority objecting to many of the measures in the so-called Pepper bill. There is no feeling in the Academy that the objects which this bill seeks to attain are in any way opposed to the principles upon which the Academy has functioned since its beginning, but there is a feeling that the measures proposed for carrying out these objects are inimical not only to the profession but likewise to the objects themselves.

Another chief activity of the Secretary's office has been the reinstatement of the men coming out of service. These men come out on terminal leave and then are discharged, at the end of a certain length of time, from the service. We have regarded the final discharge as the termination of service and have adjusted our books to meet this situation. A member is booked for a year's exemption from dues, January first or July first, depending upon which date is closest to the completion of his terminal leave. Each of these men must pay $5.00 for the JOURNAL since our contract with the C. V. Mosby Company demands this. There has been a great deal of difficulty in getting in contact with these men. Naturally, they do not think of writing to us immediately after they leave the service and sometimes their letters have been returned to us and we have had to bother other members of the Academy to obtain mailing addresses. Fortunately, we have received practically 100 per cent cooperation from these members and I wish to take this opportunity to thank them for their kindness.

The Post-War Planning Committee has been most active. Dr. John P. Hubbard of Boston has been made permanent Executive Officer for this Committee with offices in Washington. The Committee has had the active cooperation of both the Children's Bureau and the United States Public Health Service. They are getting things under way and a survey is almost completed in North Carolina, the first state where such survey has been made. A more detailed report will be given by the Chairman of the Committee, Dr. Warren R. Sisson.

Another major activity of the Academy has been the attempt to place men coming out of service in positions which they desire. Many want only refresher courses. This is true especially of the members of the Academy. However, the Academy has been able to obtain from Mead Johnson and Company a grant of $10,000 for the next two years' work and a special secretary has been set up in the Secretary's office for carrying on this work, under his supervision. This work is just getting under way, but we hope to be able to do something which will be of value.

The Committee on Cooperation with the American Legion, with Dr. Hugh McCulloch as Chairman, has been most active and the Secretary has attended meetings where the group from the Academy and that from the American Legion developed plans for cooperation. This promises to be an activity of a great deal of value to veterans' families and, in general, to pediatrics in the United States.

Few of the members realize the difficulties of holding meetings under present conditions. Hotels are inclined to look somewhat askance at such meetings and are not overanxious to hold them since their rooms are filled with transient guests. In addition to this, transportation is peculiarly bad and all in all the difficulties are much greater than they were previous to the war. We may have to revise our ideas regarding hotels and meetings in the not distant future. There is even a possibility that the hotels will charge for space for holding meetings and for exhibits.

I cannot conclude this report without mentioning the exertions of the President in the behalf of the Academy. He has been most active in several projects and his presence in Washington has on many occasions and in many ways been a tower of strength to the Society.

It is now my unpleasant duty to report to you the names of those who have left us since the last meeting:

Dr. Phillip S. Astrowe, Kansas City, Mo.
Dr. Edward S. Babcock, Jr., Sacramento, Calif.
Dr. Jules M. Brady, St. Louis, Mo.
Dr. Thomas B. Cooley, Detroit, Mich.
Dr. Manning C. Field, Brooklyn, N. Y.
Dr. Charles G. Kerley, New York, N. Y.
Dr. Robert George McAliley, Atlanta, Ga.
Dr. Frederick B. Miner, Flint, Mich.
Dr. Archibald D. Smith, Garden City, N. Y.
Dr. T. M. Watson, Greenville, N. C.
Dr. Edwin B. Weldon, Bridgeport, Conn.
Dr. James L. Winemiller, Great Neck, N. Y.

Respectfully submitted,
CLIFFORD G. GRULEE,
Secretary

Report of Region I

Arrangements have been made to hold the postponed meeting of Region I, on April 2, 3, and 4, 1946, at the Hotel Pennsylvania, New York City. Dr. Miner C. Hill, Chairman, and his committees are working diligently to make this one of the most outstanding meetings Region I has ever held. Members of the Academy from other regions are most cordially invited to attend.

The term of Associate Chairman, Dr. Louis Webb Hill, expires in 1945. Our constitution states, "The Associate Regional Chairman shall be appointed by the President of the Academy, after confirmation by the Executive Board, from a group of two or more candidates nominated by the State Chairmen of the Region." I have been instructed by the State Chairmen to present the names of Dr. Paul W. Beaven, Rochester, N. Y., and Dr. Warren R. Sisson, Boston, Mass., to the Executive Board for confirmation.

Shortly after Senate Bill 1318 was presented by Senator Pepper, I made arrangements for the bill to be sent to each State Chairman, except those in Canada. They were requested to study the bill, and in turn have as many Fellows as possible both read it and furnish to me their constructive opinions and criticisms. I have received replies from over one hundred Fellows. Less than 10 per cent were in favor of the bill. All were in favor of the objectives as expressed in the Academy's "Report of a Committee on a Consideration of Child Health

in the Postwar Period," JOURNAL OF PEDIATRICS, Volume 25, page 625. All of these letters have been sent to Dr. Grulee, our Secretary, so he can correlate the impression of the Academy's members throughout the country for the benefit of the Executive Board at its next meeting.

I wish to express my appreciation and thanks to the State Chairmen and Fellows of this region for their frank and cooperative spirit in offering these constructive criticisms. It is interesting to note that the majority of Fellows feel that health measures in Washington should be under the direction of the Public Health Department, and that the Children's Bureau should be transferred from the Labor Department to the Public Health Department.

Respectfully submitted,

OLIVER L. STRINGFIELD,
Regional Chairman

Report of Region II

Region II held a meeting of State Chairmen in Cincinnati on November 14, at the time of the Southern Medical Meeting. Those present were:

Dr. Wm. Willis Anderson, Georgia
Dr. W. W. Nicholson, Kentucky
Dr. Harvey Garrison, Mississippi
Dr. Carroll Pounders, Oklahoma
Dr. William Weston, Jr., South Carolina
Dr. James C. Overall, Tennessee
Dr. James B. Stone, Virginia
Dr. Russell C. Bond, West Virginia

Each State Chairman had about the same report to make, that is, that all the Pediatricians had been overworked and no organized Academy activity had been done.

There was considerable discussion of the EMIC program. Everyone expressed dissatisfaction with its practical working out. The men felt that the large amount of paper work far outweighed the small fees obtained. Dr. Overall had some interesting figures from the Tennessee Board of Health showing the comparative fees paid the obstetricians and pediatricians in that state. The obstetricians' fees were ten to fifteen times what the pediatricians get, mainly because of the excessive paper work required of the pediatricians.

These figures illustrate what the members said, that is, that the pediatricians were looking after the children for nothing as a patriotic duty and not sending in the claims for fees.

The fervent hope was expressed by all that EMIC would not become a permanent thing.

It was unanimously voted that the Pepper bill in its present form should not be passed by Congress. The State Chairmen had polled every member of the Academy in Region II and had found just three members who are in favor of the Pepper bill. All three of these men are full-time salaried men and not practicing pediatricians.

It was unanimously voted that if the Pepper bill should pass Congress there should be a *means* clause added for *each state* because the average income varies so much in different parts of the country. This would be especially true in the South where the average income is lower than in other states.

It was voted unanimously that before any action is taken on the Pepper bill that the Academy members be polled and the Executive Committee act according to the poll.

Respectfully submitted,

JAMES W. BRUCE,
Associate Regional Chairman
(Acting Chairman)

Report of Region III

Neither State Chairmen nor State Committee Chairmen were asked to submit reports of Academy activities within their respective states for inclusion in the Region's report to the January meeting of the Executive Board since it was felt that no abatement had, as yet, occurred in the heavy load being carried by civilian physicians. Hence, no state-by-state analysis of progress made will be attempted in this report as was the custom in prewar years.

However, interest in the revival of full Academy activities in the Region, now that the war is over, points up from several directions. First of all, plans are under way for a meeting of Region III in the spring of 1946. Earlier it was announced that the meeting place would be Chicago, but failure to secure suitable hotel facilities forced a change. According to present plans the meeting will be held at the Hotel Netherlands Plaza in Cincinnati on May 6, 7, and 8. It is hoped that by that time travel conditions will have improved and servicemen will have returned to civilian status so that a top-notch convention can be held with all hands present. In the meantime, several State Chairmen have informed the Regional Chairman that committee personnel is being reviewed preparatory to resuming activities abandoned during the war years. Attention to this phase of Academy work should be among the first to receive attention in all the states of the Region.

Applications for membership have continued on about the same level in spite of absence of many prospective members in military service. Eighteen applications were approved by the Executive Board at its June meeting and seventeen have been submitted for the Board's consideration in January. The total enrollment in Region III now numbers 469.

There have been no receipts or disbursements of funds of the Region since its last meeting. The present financial statement for Region III is as follows:

On deposit in savings account as of January 21, 1943	$2,165.24
Interest to November 1, 1945	46.44
Total	$2,211.68
Bonds held by the Treasurer of the Academy to the credit of Region III (Purchase value)	$1,850.00
(Face value $2,500.00)	
Total assets of Region III	$4,061.68

In common with the other regions of the Academy, Region III looks forward with anticipation to the January meeting in Detroit, not only because it will be the first postwar convention of the National Academy, but because of the opportunity it affords for resuming scientific presentations, and, of especial importance at the moment, for the opportunity it provides for considering the pressing social and economic problems with which the practice of pediatrics is faced.

Since the January meeting of the Executive Board marks the termination of the Regional Chairman's terms of office, he wishes to take this opportunity of expressing his appreciation to the members and officials of Region III with whom he has worked so pleasantly during the last four years.

Respectfully submitted,
LEE FORREST HILL,
Regional Chairman

Report of Region IV

Region IV has held no annual meeting since the San Francisco meeting in May, 1941. It is hoped and contemplated that one may be held in the early summer of 1946. At this writing neither the time nor place of the meeting has been determined. Hotel accommodations in the coast cities are still overtaxed with military requirements, and it cannot at present be stated when this situation will be relieved. A canvass of the State Chairmen indicated the desire for a centrally located meeting in May, June, or July. If arrangements can be made, a meeting will be held in one of these months in or near San Francisco.

Report of the Treasurer

Statement of Receipts and Disbursements

July 1, 1945, to December 31, 1945

Balance in checking account, July 1, 1945			$ 344.33
Balance in savings account, State Bank & Trust Company			3,838.72
Balance in savings account, First National Bank & Trust Company			1,544.61
			$ 5,727.66
Receipts:			
Dues		$26,705.75	
Wartime Assessment		6,445.00	
Exhibits, January, 1946, Meeting		7,965.00	
Annual meeting registration, January, 1946		1,834.00	
Annual meeting clinics, January, 1946		556.00	
Initiation fees		1,475.00	
Interest earned		487.12	
Pamphlets—Child Health Record	$ 163.36		
Immunization Procedures	255.70		
Vitamins	15.90	434.96	
Subscriptions, Men in Service		816.25	
Committee, Post-War Courses		10,000.00	
Committee, Post-War Planning		8,000.00	64,719.08
			$70,446.74
Disbursements:			
Annual Meeting, January, 1946		415.85	
Bank charge and exchange		94.22	
Certificates and mounting		38.52	
Executive Board		383.02	
Miscellaneous		265.22	
Office supplies and equipment		111.87	
Postage		199.14	
Rent		1,512.53	
Salaries—Secretary	$3,750.00		
Assistant Secretary	450.00		
Stenographer	1,140.00		
Office	710.21	6,050.21	
Stationery and printing		161.33	
Subscriptions		7,620.16	
Telephone and telegrams		226.79	
Travel—Secretary		95.65	
Treasurers' bonds		85.00	
Expense—Region V	$1,447.87		
States—Region I	19.73		
Region III	2.16		
Committees—			
Cooperation with American Legion	367.40		
Post-War Courses	240.86		
Post-War Planning	3,488.56	5,566.58	
Pamphlets—Child Health Record	9.98		
Immunization Procedures	21.42		
Vitamins	.78	32.18	22,858.27
Balance, Dec. 31, 1945			$47,588.47
Balance in checking account, December 31, 1945			34,865.78
Balance in savings account, State Bank & Trust Company			5,332.56
Balance in savings account, First National Bank & Trust Company			1,552.33
Balance in checking account, First National Bank & Trust Company			5,837.80
			$47,588.47

State Chairmen's Reports

Hawaii.—Dr. Donald C. Marshall reports little Academy activity. All but two members have been in the Armed Forces, and these two have been overwhelmed with work.

Oregon.—Dr. Carl G. Ashley reports the addition of eight new members out of nine eligibles. He also reports a unanimous opposition to the Pepper bill. Dr. Bridgeman has worked out an acceptable record card to be used for all summer camp inspections. Dr. Henricke has acted as liaison officer with the American Legion. Dr. J. W. Rosenfeld, after nineteen years of service, has submitted his resignation as Medical Director of the Visiting Nurse Infant Welfare Clinics.

The individual membership has attempted to cooperate with the EMIC program, but there have been numerous complaints of complicated record forms, delay in paying claims, and ridiculously low allowances for medical care in many cases.

Idaho.—Dr. Tremaine reports that one of the three members is still in the Navy.

St. Luke's Hospital in Boise is increasing its capacity one hundred beds, fifty of which will be occupied by an entirely new pediatric department.

The Crippled Children's Project is being decentralized with centers in northern and eastern Idaho as well as in Boise.

Dr. Tremaine also reports that Idaho has a greatly increased population and that there are several places either possessing good hospitals or projecting them, where pediatricians are urgently needed.

Utah.—Dr. Edwin R. Murphy reports that the membership has been extremely overloaded with work and that no time has been spent on Academy activity. The members have supported the EMIC program exceptionally well but view the Pepper bill with grave concern.

Arizona.—Three members are still in military service.

Dr. Vivian Tappan reports that efforts are being made to establish public schools for substandard children in Phoenix and Tucson. The purpose is to offer educational and vocaitonal training for children handicapped by chronic noninfectious diseases (rheumatic fever, asthma, recurrent nontuberculous pulmonary diseases, bronchiectasis, etc.) and for mentally retarded children for whom no provision exists. In Tucson, beginning in September, 1945, special classes for substandard children were opened in each of two schools.

During the past year two hospitals in Arizona have built specially equipped modern nurseries for the care of the newborn.

The Arizona Pediatric Society has supported the EMIC program, examined children admitted to the Crippled Children's Service, and until the past year supervised the Nursing Conferences.

California.—Cochairmen Drs. Crawford Bost and Ezra Fish report that pediatric activities have been reduced to a minimum due to the stress of practice.

The Academy cooperated with the Los Angeles Heart Association in a three-day symposium on rheumatic heart disease.

Washington.—It is with regret that we report that Region IV suffered a great loss in the death of Dr. E. J. Barnett, of Spokane.

With the war over and with some of our members already home and others due in the not too distant future, we look forward to a less arduous life and to more time to spend on Academy problems.

Respectfully submitted,

HUGH K. BERKLEY,

Regional Chairman

Standing Committees With State Activities

Report of the Committee on Cooperation With the American Legion

During the interval since the last report from this Committee to the Executive Board, there has been a meeting of the Committee in Chicago on Oct. 6, 1945. The meeting was attended by all members, and by Dr. Grulee; and by Mr. Harry C. Kehm, Chairman of the National Executive Committee of the Child Welfare Division of the American Legion; Miss Emma C. Puschner, Director; and Mrs. Marguerite G. Seibert, Assistant Director of the Division. It was the first meeting of the whole Committee, and considerable time was used for discussion of general principles for cooperation with the Legion and the part the Academy might undertake in the development of the Legion plan for child welfare. Mr. Kehm spoke fully of what the Legion is doing in this field, and of the opportunity and need for cooperation with the Academy.

Dr. Edward C. Mitchell has arranged for the publication of short articles on various subjects in the field of child care and welfare in the *National Legionnaire*, the monthly news sheet of the Legion. Arrangements are being made for the preparation of these articles by members of the Academy and other pediatricians selected for the subject. It is proposed that these articles be published monthly so long as they hold reading interest. About 2,000,000 copies of this publication are sent out each month. An article on rheumatic fever was prepared by Dr. George M. Wheatley at the request of the Legion and was published in the October number of the *American Legion Magazine*.

There was a discussion of plans for Academy participation in the Legion "April—Child Welfare Month" plan. Region and State Liaison Officers of the Academy will be requested by Legion representatives locally as the need arises.

Dr. Richdorf was selected as a member of the Committee who should show to members of the Academy who are Legionnaires, and, especially to members of the Academy who are being separated from military service, what the Legion is doing in the field of child welfare. It is recommended by the Committee that this group of professional pediatricians be used wherever possible to develop interest in the Legion Child Welfare Program, and should be selected as state liaison officers with the Legion.

Respectfully submitted,

HUGH MCCULLOCH, Chairman

Edward C. Mitchell, Honorary Chairman
L. F. Richdorf, Associate Chairman
E. T. Wyman, Region A Liaison Officer
P. A. McLendon, Region A Liaison Officer
G. M. Lyon, Region B Liaison Officer
J. H. Hess, Region C Liaison Officer
Clifford Sweet, Region D Liaison Officer

Report of the Committee on Cooperation With Nonmedical Groups

The chief accomplishment of this Committee during the past year was the preparation and distribution of a Health Card for use in camps and summer schools. A large number of these cards were ordered by the National Girl Scouts organization and several other camping groups. Numerous favorable reports have been received from camp physicians.

Various child organizations are now being contacted to determine ways in which the Academy can assist them in their health program.

Respectfully submitted,

ALBERT D. KAISER, Chairman
Roger L. J. Kennedy
Marvin Israel
Joseph I. Linde
Margaret Nicholson
James C. Overall
Warren R. Sisson
Lillian R. Smith
Edwin T. Wyman

Report of the Committee on Governmental and Medical Agencies

This Committee has held no meeting since May. The May report showed the full completion of both State and National programs of cooperation between Governmental and Medical Agencies approved by the Executive Board in June.

Respectfully submitted,

STANLEY H. NICHOLS, Chairman
Paul W. Beaven
W. L. Crawford
Alexander T. Martin
Oscar Reiss
A. L. Van Horn

Standing Committees

Report of the Committee on Fetus and Newborn

I. *Question* of Dr. D. Lesesne Smith:

Change of State laws in regard to eye prophylaxis with a view to the use of penicillin in place of silver nitrate.

Answer:

The Committee members hold the opinion that it is not advisable to recommend any change in laws or regulations relating to the use of silver nitrate for prophylaxis of the newborn infant's eyes because evidence in regard to the efficacy of penicillin in eye prophylaxis is inadequate.

II. *Question of Dr. Jerome Glaser:*
Definition of the newborn period.

Answer:

The Committee recommends:

1. That the term "neonatal" rather than "newborn" be used to cover the period after birth that Dr. Glaser asks us to define.
2. That, for the sake of uniformity, the first month (first 30 days) should limit the neonatal period. This may be regarded as an official definition since it has been agreed upon by the Children's Bureau, the American Public Health Association, and the Bureau of the Census (the Registrar, Bureau of the Census, U. S. Department of Commerce, Vol. 4, No. 2, February 15, 1939).

Respectfully submitted,

ETHEL C. DUNHAM, Chairman
Nina A. Anderson
John C. Montgomery
Howard J. Morrison
Milton J. E. Senn
Charles A. Weymuller

Report of the Committee on Legislation

Report to be given personally by Chairman at the meeting.

Respectfully submitted,

JOSEPH S. WALL, Chairman
Jay I. Durand
Harvey F. Garrison
Philip Van Ingen
Alfred A. Walker

Report of the Committee on Pan-American Scholarships

We have now eleven scholars; the last of these will have completed his course on Oct. 1, 1946. No arrangements are being made for new scholars for the next two years, owing to the crowded condition of our clinics as a result of men coming home from service.

Respectfully submitted,

CLIFFORD G. GRULEE, Secretary

Report of the Committee on Pediatric Awards

The Committee recommends that, for this year, the Mead Johnson Awards should not be made. It appears that it is better to do this than to lower the standard required for the awards which, in the past, have been given for work of outstanding merit. The Borden Award will be presented.

Respectfully submitted,

S. GRAHAM ROSS, Chairman
Oscar M. Schloss
Joseph Stokes, Jr.
Wilburt C. Davison
Grover F. Powers

Report of the Program Committee

The Program Committee recommends that a Full Program consisting of Round Table Discussions, Panels, Symposia, and individual speakers be arranged for the next Annual Meeting of the Academy.

Respectfully submitted,

EDGAR E. MARTMER, Chairman
Frank H. Douglass
R. Cannon Eley
M. Hines Roberts
Matthew Winters

Special Committees

Report of the Committee on Geographical Distribution of Pediatricians

To date I have completed about twenty-eight separate surveys and have covered more than one-half of the requests as per the list sent to me by Dr. Grulee. Some of the surveys were rather lengthy and covered much territory. Each survey included (1) the population and increase or decrease of same for past five years; (2) the total number of physicians, plus increase or decrease; (3) the total number of Pd*, Pd, FAAP, and Diplomates (1937-1942); (4) university and hospital facilities for a given locality, city, county, or state. This gives the sort of information that is helpful in estimating the growth of a locality within the five-year period from 1937 to 1942.

I have had letters from several men who have indicated that the survey has been helpful. The remainder on my list will be finished soon.

Respectfully submitted,

OTTO L. GOEHLE, Chairman

Report of the Committee on Rheumatic Fever

Our Committee has not met as a group since the meeting in St. Louis one year ago, but has conferred individually and by letter so that the work of the Committee has been kept activated. The Committee notes with satisfaction the publication in a separate booklet the entire Symposium on Rheumatic Fever held at the St. Louis meeting. This has been done by the Pennsylvania State Department of Health and has been distributed throughout the State for educational and promotion purposes. The American Council on Rheumatic Fever has been set up and incorporated under the leadership of the American Heart Association. Two mem-

bers of the Committee are represented on this Council, which is also represented by other organizations such as the American Medical Association, American College of Physicians, American Public Health Association, American Rheumatism Association, American Hospital Association, American Nurses Association, and American Association of Medical Social Workers.

The Committee has three broad objectives:

1. Educative
2. Standard-setting
3. Evaluation

The educative function of the Committee was focalized in the Symposium on Rheumatic Fever at the St. Louis Session in 1944. The Standard-setting function will be the concern of the Committee at the Detroit session, and a joint meeting with the School Health Committee will be held to discuss standards for diagnosis and the principle of a cardiac consultation service for school children. The evaluation of results of the various state programs is an important objective and it is hoped that this may be worked out in cooperation with the Children's Bureau.

A recent communication has been received from a group in Montevideo with a specific mention of the role which the Academy has taken in the field of rheumatic fever. The high incidence of rheumatic fever in the Armed Forces in both World Wars has augmented the public interest in this disease. This, in turn, is a challenge to the Academy to contribute its resources in the control of a disease which is essentially a disease of childhood.

Respectfully submitted,

ALEXANDER T. MARTIN, Chairman
Stanley Gibson
John P. Hubbard
Hugh McCulloch
Eugene H. Smith
R. R. Struthers
George M. Wheatley

Report of the Committee on Post-War Courses in Pediatrics

The immediate objectives of this Committee were (1) to ascertain approximately how many medical officers returning from military duty after the war would wish to take post-graduate courses and other types of training in the field of pediatrics, and (2) to survey the pediatric training facilities of the United States and Canada in order to determine to what extent such demand can be met. The ultimate aim of the Executive Board of the Academy was to develop, on the basis of the Committee's findings, an effective mechanism for aiding our deserving medical veterans to find suitable opportunities for further training in their chosen field.

The first immediate objective was attained by the Committee's being given free access to the returns from Dr. Grulee's poll of Academy members serving with the Armed Forces and to the results of a large-scale, systematic survey carried out among Medical officers by Lieutenant Colonel H. C. Lueth. Approximately 30 per cent of the Academy members in the various services expressed a desire to take from one to four months of informal postgraduate training in a pediatric clinic or hospital before returning to office practice. A still larger number have subsequently expressed a wish for short, intensive, more or less didactic refresher courses in pediatrics and related fields. A small number of those members who have written to the Committee have manifested an interest in obtaining full-time academic or hospital positions with more or less permanent tenure.

On the basis of Colonel Lueth's questionnaire returns from 21,029 officers it was estimated that a total of between 2,200 and 2,400 physicians serving with the Army, Navy, Public Health Service, and Veteran's Administration would wish to have further training in pediatrics following their release from duty. One-third of these, mostly the older men, expressed a need for short courses only, while the others wanted from one to three additional years of training.

Fifty per cent of the older officers and 80 per cent of the younger men expressed a desire to prepare for certification by the American Board of Pediatrics. It was impossible to obtain reliable information in advance regarding the rate at which such medical officers would be released from duty.

Returns from the various polls indicate that the following types of training opportunities are needed: (1) Informal postgraduate "brush-up" experience of several months' duration in a general pediatric clinic. About 120 veterans who are members of the Academy desire such an opportunity. (2) Intensive, more or less academic, refresher courses of a few days to a week's duration for several hundred previously well-trained pediatricians who have not been able to keep up to date with the newest developments in the field. (3) Straight or full-time internships in approved pediatric hospitals and outpatient clinics for young physicians wishing to specialize in pediatrics but who were trained in other branches of medicine or had rotating internships only before entering the service. (4) Assistant residencies in pediatrics for physicians who had but one full year of clinical training in the field before being inducted into the Army or Navy. (5) Residency positions for those men who had previously served both internships and assistant residencies. (6) Teaching assistantships and research fellowships for those veteran pediatricians, who have completed the two years of special training required for certification by the American Board of Pediatrics but who need or desire to attain still greater competence in their field before turning to practice or seeking an academic or other regular position.

To accomplish its second preliminary objective the Committee prepared a comprehensive (but simple-to-answer) questionnaire, mimeographed copies of which were sent to the professors of pediatrics or chiefs of service in 77 leading medical schools and hospitals in Canada and the United States. Questionnaires were completely filled out and returned by 61 representative institutions. This was regarded as a good return, considering the current demands on the time of such administrators.

Analysis of these questionnaire returns indicates that 80 per cent (the percentage replying) of the 77 pediatric clinics polled, list the following total numbers of regular full-time training positions in pediatrics without regard to wartime quotas: 134 straight internships, 173 assistant residencies, 93 residencies, 63 research fellowships and 58 teaching assistantships, totaling 687 training positions. On this basis there should be a total of about 860 positions in the 77 institutions. In addition, the 61 institutions listed a total of 166 rotating internships. The total numbers of additional full-time training positions of standard quality which these 61 institutions said they could create without committing themselves for maintenance or financial stipend were as follows: 89 straight internships, 116 assistant residencies, 81 residencies, 86 research fellowships and 91 teaching assistantships, totaling 463 potential training positions. This would indicate approximately 580 potential new training positions in the 77 institutions. It is obvious from inspection of the returns, which showed in addition to the foregoing data, such information as bed capacity, outpatient clinic attendance, etc., that many more than this number of new training positions could be made available, if even minimal financial support for the trainees could be provided. It is recognized that support from the G. I. Bill and personal savings of veterans, set aside for such purpose, may make many of these potential positions acceptable, if the demand for training opportunities far exceeds the supply.

Under ordinary conditions a large percentage of the 860 regular full-time training positions referred to above as occurring in 77 institutions and others not listed are filled by civilian physicians coming up through the ranks. However, the new order recently issued by the Army and Navy for induction into service of all reserve officers in positions beyond the internship level after April 1, 1946, will release all assistant residency and residency positions other than those held by women and men on 4-F status. These vacancies and all of the new or potential positions already referred to should be available to medical veterans desiring them.

There are many additional public, private, and semiprivate clinics for children which could offer suitable training positions if they were affiliated for the purpose with the larger pediatric teaching clinics. In some of the larger centers, local committees have made plans

for creating suitable rotations between various types of service in such nonteaching hospitals and regular teaching hospitals for the purpose of increasing the number of acceptable positions available. It is hoped that many other such arrangements will be organized.

The Committee had sincerely hoped to accumulate sufficient information regarding available training positions and postgraduate courses throughout the United States and Canada to permit their being catalogued for immediate service to our medical veterans upon their return to civilian status. However, the suddenness of the war's termination, which had not been anticipated, and the unavoidable delays incident to the necessity of conducting most of the work of the Committee by correspondence, found the organization unprepared to give substantial help to the first contingent of returning medical officers. While the Chairman of the Committee has been able to assist a fair number of physicians to find suitable training positions by correspondence, lack of a list of vacant positions and of spare time for correspondence has made it impossible for him to reply to all inquiries.

At the only meeting held by the Committee, that in Galveston, Texas, on November 16 and 17, it was agreed to recommend to the Executive Board of the Academy that a central clearinghouse for training positions be set up in the Office of the Secretary in Evanston, Ill., to handle all correspondence pertaining to training positions for medical veterans. The recommendation included the proposal that a grant of money be requested from some outside agency known to be friendly to the purposes of pediatric education and practice to defray the costs incident to this prodigious new undertaking for a period of at least two years. Dr. Grulee, who attended the meeting at the request of the Committee, agreed to approach the Mead Johnson and Company or the Kellogg Foundation for a grant of $5,000 per year for a period of two years. In response to a letter from Dr. Grullee, the Mead Johnson and Company generously contributed the sum requested, which insures the carrying out of the Academy's new service to its own members and to other medical veterans wishing to specialize in pediatrics.

In order to expedite the work of the central office, an explanatory form letter has been sent by the Committee to the 77 institutions which received the original questionnaire with the request that they supply the Academy Office with complete and up-to-date lists of all service-connected physicians and veterans applying for positions and courses in pediatrics and also lists of training positions, both regular and specially created, which are expected to be vacant. Much duplication of correspondence will be avoided by this means.

Those receiving the letter will be asked if they cannot invite at least two veterans Academy members at a time to spend a period of three months each as informal guests of their clinics. During this time such pediatrically trained veterans would undoubtedly be able to get back into the swing of clinical practice in their field. It was the consensus of the Committee that this kind of opportunity would satisfy the needs of most Academy members and other pediatricians with similar training and aspirations. Since a fair-sized number of returning Academy members have manifested special interest in short intensive refresher courses, those institutions offering such opportunities are requested to furnish notices of the same. These will be classified according to type of course offered and geographical location for use by the central office in replying to inquiries received.

Judging from the questionnaire returns, the Committee members are convinced that this clearinghouse service for bringing available candidates and surplus positions together will prove to be so useful that numerous requests will come to the Academy for its continuation beyond the period of the present emergency.

Respectfully submitted,

IRVINE MCQUARRIE, Chairman

Harold K. Faber
Stanley Gibson
Alton Goldbloom
Arild E. Hansen
Joseph A. Johnston
Rustin McIntosh

Report of the Committee on Post-War Planning

Since the last report to the Executive Committee, the full committee on the Study of Child-Health Services, together with Mr. Rollo Britten of the U. S. Public Health Service, Mrs. Elizabeth E. Boles of the Hospital Commission, Drs. Katherine Bain, Charles L. Williams, Jr., and Joseph Lachman, met in Chicago on Oct. 20, 1945.

The most important development since our October meeting has been Dr. John P. Hubbard's acceptance as Director of the Study. Dr. Hubbard is a member of the Academy, was in active practice before the war, and has more recently been a Colonel with the A. M. G. with assignment in Denmark. We are fortunate to have as our Director a physician with keen clinical interest and appreciation of medical needs and experience in medical organization. As you will recall, our technical staff now consists of Dr. Hubbard as Director with Dr. Bain and Dr. Williams as associates. I have asked Dr. Hubbard to be present at the Executive Committee meeting to give you first-hand his impressions of the Study up to date and to outline future plans.

The pilot study in North Carolina was started in October under the supervision of Dr. Joseph Lachman. We are at this time very much gratified by the unequivocal cooperation between the Academy members and our study group. The study has progressed very satisfactorily and will be concluded this month. An exhibit of the methods employed in this pilot study will be presented at the Detroit meeting.

One of the most pressing needs is more adequate office space. We are now ensconced at our headquarters in Washington at the Children's Hospital with a half-time secretary. This is most inadequate and we need room not only for the technical staff with increased secretarial assistance, but also space for the increasing volume of correspondence and completed schedules. We have been able to locate possible suitable offices in Washington and this will be put before our advisory committee before final decision is made. You probably will recall that a space at the Children's Hospital, so kindly donated by that institution, consists of one small room, and further space is not available there.

One of the imminent problems concerns the financing of our Study. On Dec. 10, 1945, Dr. Hubbard, Dr. Bain, Dr. Dean Clark (formerly of the U. S. Public Health Service), and your Chairman had a conference with Dr. Van Riper, the Assistant to Dr. Gudakunst, who is Medical Director of the National Foundation for Infantile Paralysis. We feel justified in stating that a substantial sum will be assigned to us from the Foundation. On December 19, we meet again with the Rockefeller Foundation which we hope will be interested in aiding us in the educational study which is now about to be launched under the direction of Dr. James L. Wilson. We have also recently visited the Marshall Field Foundation in New York. We were very cordially received and have made a definite request for $10,000 from them. We have taken under advisement the suggestion to request financial aid from pharmaceutical houses and manufacturers of baby foods, etc. It is hoped that in this way we will be able to obtain a number of grants of $5,000 to $10,000 each. We should like the advice and support of the Executive Committee in this matter.

The Committee also feels that the Academy of Pediatrics should consider renewing an allocation of $8,000 to $10,000 to the Study for another year.

Respectfully submitted,

WARREN R. SISSON, Chairman

John P. Hubbard, Director
Allan M. Butler
Harvey F. Garrison
Henry F. Helmholz
Lee Forrest Hill
Joseph I. Linde
Borden S. Veeder
Joseph S. Wall
James L. Wilson

Report of the Committee on Tumor Registry

Report to be given at the meeting.

Respectfully submitted,

HAROLD W. DARGEON, Chairman

Hayes Martin
Herbert F. Jackson

Report of the Nominating Committee

Recommendations:

For Vice-President (President-elect)

Dr. Lee Forrest Hill
Des Moines, Iowa

For Chairman of Region III

Dr. George F. Munns
Winnetka, Illinois

Respectfully submitted,

J. A. HENSKE, Chairman

Hugh Chaplin
Hughes Kennedy, Jr.
Oscar Reiss

There are no reports from the following:

Committee on Contact Infections
Committee on School Health
Committee on Honorary Fellows
Committee on Hospitals and Dispensaries
Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases
Committee on Medical Education
Committee on Mental Health
Committee on Nursing Education
Committee on a Library and Museum of Pediatrics
Committee on Mothers' Milk Bureaus
Committee on National Defense
Committee on Nutrition
American Board of Pediatrics

The Social Aspects of Medicine

MEDICAL EDUCATION

PROPOSAL FOR DECENTRALIZED MEDICAL TEACHING AS AN AID IN IMPROVING MEDICAL CARE

It seems to be the consensus of all that, since a large part of the lower income groups of our population cannot get adequate medical care under our present system, tax money will and should be furnished in increasing amounts to provide them with it. The public is so thoroughly convinced of this that schemes to support medical care have become so politically profitable that numerous bills for such projects have been before Congress. All the proposed schemes, whether narrow in scope or so far-flung as to cover medical care for all at a cost of billions, practically ignore the problem of medical education or offer casual and nonspecific gestures of support. It seems obvious that no amount of money can give all our people good medical care except as medical schools supply us with more men with better education and training than at present. The techniques of medical education need radical revision from the first year up, but the most neglected period is in the early postgraduate years where, in the last decades, most of the clinical training is given. I believe that since the education of young physicians and the medical care of the poor has been in the past so advantageously associated to their mutual benefit, that energetic steps should be taken to encourage the extension of our medical education system to small cities and towns and even to rural centers and not restrict it, as at present, to a few great medical centers. It is obvious that no single plan will furnish a complete and good solution to the problem of the adequate distribution of good medical care, but we have almost entirely neglected fruitful opportunities already at hand.

In brief, I believe we should undertake a great expansion with improved organization of the present system of internships and residencies so that after the first three years of medical school, from three to six years of further clinical training be provided for each student who intends actually to practice medicine. The young doctor and his work should continue to be supervised by a medical school while he should be paid on an increasing salary schedule sufficient to allow him to live a normal life and assume family obligations. The clinical teaching for these three to six years should be in greatly increased numbers of teaching hospitals or clinics making use of a far larger clinical teaching staff, the members of which should themselves be continually under medical school influence. To implement this in part, the large teaching hospitals now connected with medical schools should have organized around themselves dependent satelite institutions from which medical and nursing home care will stem and to which the advantages of the teaching center with laboratory and clinical consultation and a supervised resident staff will be systematically extended.

The justification for such a program rests on the following beliefs:

1. Most physicians, like other men, need a constant urge to exert their best and few can drive themselves with only their conscience. Some stimulus of desire for large possessions, competition, pride, love of learning, fear of loss of income or prestige, exposure of work to criticisms, is necessary for energetic application to work and self-improvement, and the direction of development will be determined to a great extent by which stimulus is dominant.

A salaried physician with a future secured by government appointment often has little stimulus since no supervisory system organized and executed by a government agency can detect poor medicine except that of the gravest nature, or can exert any control of the quality

of medicine practiced except by regulations which will level all practice and handicap the best. Sound and fair criticism of a physician's work is exceedingly difficult except by another physican closely working with him.

Competition for patients does not result in good medicine. It is quite impossible for most lay people to judge a good physician or to distinguish good from bad treatment. A good bedside manner, an attitude of uncritical self-confidence, a ready treatment, good or bad, but positively offered for every complaint, often makes the most financially successful practitioner. The worst quack may have a great advantage over an excellent and honest physician.

2. Excellent medicine is likely to be practiced around a good medical school where the stimulus of teaching or learning is present, where diagnostic and therapeutic skill is under the constant observation of critical students and where records are kept for future analysis by others than he who makes them.

The danger of a cold inhuman "research" attitude around such teaching centers is real, though often exaggerated. Certainly, an attitude where "experimental" medicine in its bad sense is emphasized is frightening to patients and wrong under any circumstances. Ignorant and poor patients who permit such occasional abuses, more common by far in Europe, make very poor "material" for teaching students in any case. A student, from the beginning, should be in contact with patients who are demanding.

A medical school should play an active, vital and stimulating part in all the health activities of the community and state. Its activities should not be limited to academic teaching and research, or simply to turning out of finished doctors at the end of four years to go their own way. As medical education should continue during the lifetime of a physician, so a medical school should continue to play as active a part as possible in the practice of medicine of all physicians. The best student of medicine is a teacher. The best teacher is a student. The best practitioner is a constant teacher and student.

Although a good clinical faculty must include a number of full-time workers, a great deal of the teaching must and should be done by practitioners giving part time to the medical school. With proper organization and with good men, there is hardly a practical limit to the number of part-time teachers that can be of value.

Ideal instruction for students of clinical medicine, whether undergraduate or graduate, is by apprenticeship to a good and active clinician who is willing and able to teach and who can constantly stimulate the student to work in library and laboratory in frequent contact with organized research work. The assistance of a student of medicine to a practitioner of good ability, who allows free questions and discussion, stimulates him to his best efforts.

3. Medical education at present is considered by many too long and too expensive. Even so, a laudable tendency exists now in the best medical centers to increase the time spent in training by three to five years' residency in a hospital. This long training period is not unusual for the best trained doctors and is highly desirable for the good of the public; yet the young physician may thus not be self-supporting until after he is 30 years old, although he should be financially independent and able to assume the normal financial responsibilities of an adult far sooner. Many men, often the most intellectually able to profit by long training under supervision, must curtail their program of study because of financial pressure. In a long postgraduate education the resident physician performs an important public service by his work. In so far as he further trains himself, his contribution to the public good and his future patients becomes greater. It seems highly desirable that this extensive system of training should be encouraged and be paid for, and that many more opportunities for such training be provided. The need for resident physicians in our smaller hospitals is becoming more and more realized although the shortage of good positions forces many men to accept positions that are poorly organized for teaching. In fact, in the majority of internships, the young doctor is exploited by the hospital and made to work at preponderantly uninstructive routines for a little pay and a slipshod training. There is a great need to improve and increase the opportunities for hospital training.

There is a tremendous need in all but the largest teaching hospitals for more and better resident physicians and for resources to pay them.

4. Considerable state and private philanthropic effort has been directed to so-called postgraduate instruction, that is, attempts to bring physicians already some years in practice back to medical schools and hospitals for review studies and to be brought "up to date." Such instruction is often disappointing, the physician being too long away from his basic medical study to profit except from simple directions as to some latest therapy and the period that he can spend in "refresher" courses is short and intermittent. Attempts to re-educate a man, after he has been allowed to get out of touch with medical progress and forgotten the basic principles of physiology and pathology by which new information must be intelligently appraised, is obviously a poor substitute for a continued stimulus of medical study and training. The man is likely to be in a hurry to get back to his practice; the course is concentrated; at the time, he does not see the relationship between the theory taught him and his practice; the laboratory procedures recommended and techniques outlined often seem to be so beyond his skill that he quickly considers much that is taught too theoretical and impractical and rejects it. It would be much better to bring the consultant and teacher, with ability and willingness to contribute technical aid, to the practitioner in his own hospital and community while he is working on his own patients.

5. In the past, much of our clinical teaching has been in large clinics for the poor and has been supported by the charity of physicians who contributed their services and by others who furnished money. It certainly is the purpose of every statesman and every public-minded individual to wipe out the medically indigent and, since it is obvious that medical education must be continued at all costs, the "material" for clinical medical instruction in the future must come increasingly from the people for whom medical care can be paid. This tendency to use private patients for teaching should improve medical pedagogy and should be encouraged.

It seems obvious that if the systems of medical education be extended to make use of small hospitals for long residencies properly supported by suitable salaries, that the small hospital would benefit as well as the student who might not otherwise be able financially to take further training. Such an internship or residency, however, would not be justifiable unless the quality of instruction of the University center be maintained and extended to the small hospital. This, however, is quite possible. An interlocking system of satelite hospitals would need to be developed around each suitable medical school so that the satelite hospital can be a medical center for a small community and yet depend on the larger institution, possibly a considerable distance away, for special laboratory and x-ray services, for pathology and special consultants and a resident medical staff. The smaller institution with a good intern and resident staff, with paid local teaching physicians as they are available, supplemented by visiting instructors from the medical school, could, with the advantages of the laboratory and consultation service of a medical school connection, be kept as good a teaching organization for the graduate as the University hospital itself.

The local physicians who, in the course of years would ultimately be drawn from the group of residents, would be made teachers when their abilities allowed it, would have a constant opportunity for their own continued education, and frequent contact with the medical school teachers who, being responsible for the type of training of the residents and interns, would make frequent visits. All hospitals used for such a program should be the locus of doctors' offices with more efficient organization of secretaries and nurses and laboratory services than can be supplied by the individual physician. Our present "Out-patient Department" or clinic for the poor would disappear, as it should, and these patients be cared for in such a medical school sponsored collection of group practicing offices in hospitals.

The general plan of a complete medical education in such an organization would be based on four periods:

A. Premedical school. Still in the colleges with greater emphasis on basic sciences, psychology and sociology, three or four years.

B. Medical school, three years. Basic medical sciences with instruction in clinical techniques and study of disease, quite reorganized from what we have at present. The early courses in anatomy and morphological pathology should be shortened greatly to be retaught in the third year, after the student has become acquainted with the technique of approach to patients and has studied the symptomatology of disease. Physiology and bacteriology and chemistry would also be reviewed in the third year in connection with clinical problems.

C. Applied clinical medicine, two years. This should be a greatly improved rotating internship, full of supervised clinical responsibility but also with laboratory work in bacteriology and pathology. Much of these years would be spent in the larger hospitals although short periods, especially for supervised home visit experience, could be spent in the smaller and sometimes rural institutions.

D. An indefinite period of supervised medical practice lasting from two to five or more years, covering the work now done by residents, research fellows, junior teachers. These men, themselves under supervision, would do a large part of the intern instruction. They would enter their specialties, plan an academic life or pursue a training for general practice, not now available, during this period. The students under C and D should be paid a salary sufficient for a dignified living with family responsibilities.

No mention has as yet been made of the important problem of financing such a project. Inevitably the problem of the support of medical education and the whole controversial subject of the best methods of distributing medical care to the lower income groups are involved and no attempt here is made to solve these problems. No great increase in the medical care of our people or improvement in its quality can take place without far greater support of medical education. Great foundations, and State and National government agencies are full of plans for the support of specific research projects and for direct payment for medical care while allowing the basic budgets of medical schools to remain ridiculously inadequate, eked out by small grants begged for by men better engaged in professional activity. Medical schools should be given direct aid from tax money. It seems obvious that whatever is accomplished to extend better medical care to the lowest income group, money from public funds derived from taxation must be used. Inevitably, if tax money is used, the efficiencies of some sort of group practice will be necessary to reduce the cost. There seems no good reason why a medical school itself, with its own teaching staff expanded as described, should not organize a group practice system as a basis for teaching as well as giving good medical care. Whatever the future holds for us, whether tax supported medical program, private prepayment insurance programs, or a continuation of our present medical practice habits, the decentralized combined educational-medical care program outlined so briefly here could be carried out, and none of a variety of methods for financing it would seriously influence the usefulness of the basic idea of the program.

(Signed) JAMES L. WILSON

Ann Arbor, Michigan

It is no accident that the first medical journal in this country to launch a section on the social aspects of medicine as a regular feature happens to be the JOURNAL OF PEDIATRICS, a periodical by and for pediatrists. The very nature of their specialty has made them pioneers in the practice of preventive medicine. It is true that early pediatrists conceived their role of service in this field to be primarily the prevention of disease. This negative concept has recently enlarged to encompass the promotion and preservation of child health. Acceptance of this expanded sphere of service calls for as keen a knowledge of social conditions as of medical science itself. The medical forum inaugurated by the JOURNAL OF PEDIATRICS is a harbinger of the growing recognition by pediatrists of their expanding obligations as purveyors of medical care.

If the goal of child health promotion is the development of the whole personality of the child and the attainment in full of his inherent potentialities, social factors take on an importance equal to purely medical ones. The pediatrist has been at fault in his lack of interest and, because of poor educational preparation, in his inadequacy in this field of service. He has usually neglected such important social factors as housing, recreational facilities, and educational opportunities; has given too little attention to mental development, emotional adjustment, habit formation, and social fitness; and has in the main been satisfied to confine his efforts to dietary supervision, physical care, and specific prophylaxis against disease. In his capacity as a promoter of health as well as an arbiter of the sick, the pediatrist (and for that matter all physicians) should be willing and able to assume the task of initiating, guiding, and participating in individual and community health programs and of cooperating with all interrelated civic agencies interested in child welfare.

The traditional reluctance of the pediatrist (and physician) to recognize and accept his heightened social responsibilities stems directly from his educational background as a medical student and hospital house officer. His undergraduate medical curriculum in the clinical years was focused on the study of pathology and disease; in his hospital training, the chief focus remained the diagnosis and treatment of the sick. Throughout his formal training, the preservation of health per se and its dependence on social factors were minimized and instruction often relegated entirely to the Department of Public Health with perhaps additional smatterings gleaned from enlightened Departments of Pediatrics and Medicine. It is precisely in this sphere of medical practice that I believe medical education has been found wanting.

Has not the time arrived to give consideration to a revision and reorientation of medical education, general and pediatric, at both undergraduate and graduate levels, to keep abreast with the enlarging sphere of medical practice and the expanding duties of physicians? The spirit of laissez faire which marked the last century is rapidly crystallizing into one of social consciousness and the doctor must be properly trained to keep step with changing trends if he is to retain civic leadership in medical matters.

This column is not the place to present in detail revised medical programs of pediatric education designed to stress health promotion. They will necessarily vary in different institutions and localities and their experimental nature will subject them to further revisions with added experience. To start discussion, it will suffice to mention here a number of hitherto relatively neglected instructional mediums which might be put to more effective use. Of first importance is the home and family set-up. Every trainee should be given the opportunity of making home visits and furnishing domiciliary medical care under adequate teaching supervision. Other potentially valuable mediums include prenatal clinics, newborn nurseries, pediatric outpatient departments with opportunities for working in well-baby, adolescent, prophylactic, and mental hygiene clinics, baby health stations, schools (nursery through secondary), recreation centers, juvenile courts, adoption bureaus, foster homes, and convalescent institutions. Attendance, observation and preferably participation in the activities of all or some of these agencies under supervision would serve to acquaint the trainee with the manifold number and variety of interested agencies and the precise contribution of each to the common goal of child health and welfare.

Instruction of this kind would enable the prospective pediatrist in the course of his training to work in close collaboration with public health nurses, social workers, nutritionists, public health officers, psychologists, teachers, and above all parents and siblings in the home environment. In later practice, he would not be at a loss as he so often is now without previous experience when he seeks help from civic groups for his patients. Maximal progress in child health promotion can only accrue from the joint efforts of all groups, lay and professional, voluntary and official, and the well-trained pediatrist would possess the knowledge and background to make a real contribution.

The objection may be raised, not without justification, that pre-eminence in medical education in the United States has been reached through the concentration of resources in a limited number of basically important fields and that any attempt to enlarge the already

heavy burden imposed on medical students and hospital house officers will lead to confusion and turmoil. This policy of subordinating expansion to excellence is in general a wise one, but the enlarging role of the physician in society urgently calls for revaluation of the aims of medical education. If time limitations require reasonable reduction in the hours assigned to traditional clinic lectures, bedside teaching and impatient rounds, the benefit derived is, I believe, worth the sacrifice.

The purpose of this section is to invite discussion on medical questions of a social nature. The interrelated questions of pediatric (medical) education and the heightened social responsibilities of the pediatric (medical) practitioner have been posed in the hope that frank discussion will stimulate interest and lead to action by pediatrists and the Academy of Pedatrics.

S. Z. LEVINE, M.D.

The Pediatrician and the War

Lieutenant Colonel William A. Reilly of Redwood City, Calif., has been promoted to Colonel.

The following Fellows have been released from service with the Armed Forces:

Dr. Harry E. Baldock, Charleston, W. Va.
Dr. Sidney Blumenthal, New York, N. Y.
Dr. John E. Brown, Jr., Columbus, Ohio
Dr. John W. Canaday, Glens Falls, N. Y.
Dr. Paul D. Clark, Burlington, Vt.
Dr. Carl L. Cohen, Chicago, Ill.
Dr. Harold W. Dargeon, New York, N. Y.
Dr. Max Deutch, St. Louis, Mo.
Dr. J. Gilbert Eblen, Knoxville, Tenn.
Dr. Lee E. Farr, Wilmington, Del.
Dr. Edward A. Hardy, Mt. Vernon, N. Y.
Dr. Frank D. Hazlett, Washington, Pa.
Dr. R. R. Hippensteel, Indianapolis, Ind.
Dr. Louis Judelsohn, Buffalo, N. Y.
Dr. W. P. Killingsworth, Port Arthur, Texas
Dr. Howard T. Knobloch, Bay City, Mich.
Dr. Robert H. Kotte, Cincinnati, Ohio
Dr. J. N. Lande, Sioux City, Mich.
Dr. Harold Lipton, Danbury, Conn.
Dr. Clarence L. Lyon, Spokane, Wash.
Dr. John J. Miller, Jr., San Francisco, Calif.
Dr. Lee Plamer, Louisville, Ky.
Dr. Mila I. Pierce, Evanston, Ill.
Dr. Ralph E. Pray, Salinas, Calif.
Dr. Warren W. Quillian, Miami, Fla.
Dr. Robert P. Rogers, Greenwich, Conn.
Dr. Byron K. Rust, Indianapolis, Ind.
Dr. Robert O. T. Warren, Wilmington, Del.
Dr. Ernest S. Watson, Elmhurst, Ill.
Dr. Carl Witus, Detroit, Mich.

News and Notes

The second Annual Lecture in honor of the late Dr. Joseph Brennemann was given on Dec. 27, 1945, at Los Angeles by Dr. Harold K. Faber, Professor of Pediatrics at Stanford University School of Medicine, under the auspices of the Pediatric Section of the Los Angeles County Medical Association. Dr. Faber's topic was "Human Poliomyelitis; Observations on the Portals of Entry and on Their Relation to the Initial Symptoms."

The meeting of Region III of the American Academy of Pediatrics which was to have been held on May 6, 7, and 8, 1946, at the Netherlands Plaza Hotel, Cincinnati, Ohio, has been cancelled.

At the annual meeting of the American Board of Pediatrics the following officers were elected:

Dr. C. Anderson Aldrich, Rochester, Minn., President
Dr. Donovan J. McCune, New York, N. Y., Vice-President
Dr. Lee Forrest Hill, Des Moines, Ia., Secretary-Treasurer (with offices at 3309 Forest Avenue, Des Moines)

Dr. Charles McKhann, Cleveland, Ohio, was appointed to the Board by the Section on Pediatrics of the A. M. A., replacing Dr. F. P. Gengenbach whose term expired.

With the retirement of Dr. C. A. Aldrich, who has held the positions of secretary and treasurer since the Board was started, the office of the Board has been moved to 3309 Forest Avenue, Des Moines, Iowa.

The Board announces the following examinations:

Written Examination—locally under a monitor, March 22, 1946
Oral Examinations—Cleveland, Ohio, April 27 and 28, 1946
San Francisco, Calif.—at the time of the meeting of the A. M. A. (July 1-5) if sufficient applications are received to warrant this examination

At the annual meeting, due to increased expenses, the application fee on and after May 1, 1946, was placed at $100.

REPORT* OF ANNUAL MEETING OF THE CHILDREN'S BUREAU ADVISORY COMMITTEES ON MATERNAL AND CHILD HEALTH SERVICES AND ON SERVICES FOR CRIPPLED CHILDREN, CHILDREN'S BUREAU U. S. DEPARTMENT OF LABOR

NOV. 8 AND 9, 1945

The meeting was called by the Associate Chief of the Children's Bureau particularly to obtain advice on Senate Bill 1318 (H.R. 3922, H.R. 3994, H.R. 4059) known as the "Maternal and Child Welfare Act of 1945." To this end six committees were appointed from the members of the Advisory Committees to consider on November 8 various aspects of the proposed legislation and report their opinions to the general session of the Committees on November 9.

The reports as modified and accepted or adopted in the general session and a statement by Dr. Eliot are transmitted herewith in accord with the unanimous recommendation of the general session in order to make them available for such use as each member of the Advisory Committees and the Children's Bureau might deem desirable.

*Report prepared by Dr. Allan C. Butler at the direction of the Advisory Committees.

REPORT OF COMMITTEE TO CONSIDER BASIC PHILOSOPHY AND PRINCIPLES PERTAINING TO S. 1318

This Committee discussed many fundamental principles pertaining to such legislation as proposed in S. 1318.

Certain reservations as regards the jurisdiction of the Federal administrative agency under this bill, its departmental allocation and the integration of this agency, and the proposed maternal, infant, and child medical care program with other Federal health plans were discussed. Before giving critical consideration to the details of the proposed legislation the Committee wishes to make it clear that such consideration does not necessarily constitute an endorsement of the proposed allocation to a bureau in the Department of Labor of authority to develop and direct such an extensive medical care program.

The Committee recognizes the far-reaching and significant contributions of the Children's Bureau to maternal and child health, especially in the fostering of high standards of medical and welfare services. However, in such a program as envisaged in this major step in the development of a Federal Health Program problems of State responsibilities and relationships with Federal agencies are involved which demand consideration of the qualifications of the proposed agency for their conduct and consideration of ability to integrate the proposed program with those for the provision of health and medical services for the remainder of the population.

The Committee recommends that Congress give careful study to the problem of the proper agency to conduct this program and of the relationship between governmental agencies concerned with medical and health services.

The Committee discussed and voted as follows on the following questions:

1. Do we believe that maternal, infant, and child care is in need of better financial support than exists today?
   Answer. Unanimously, "Yes."
2. Do we believe that more adequate financial support will of itself provide better maternal, infant, and child care?
   Answer. Unanimously, "No."
3. Do we believe that all persons rendering medical services should be remunerated adequately for services rendered including services rendered the indigent?
   Answer. 16 "Yes." 1 "No."
4. Do we believe that the medical care of those who are unable to afford direct payment or prepayment for such service is the responsibility of government?
   Answer. Unanimously, "Yes."

Disapproval of paragraph (3), page 4, line 3 of Sec. 103 was voted by 10 members, while 6 members voted approval.

The following modification of that paragraph was favored by 14 members and opposed by 3 members.

> "(3) provide that as services and facilities are furnished under the plan they shall be available to all mothers and children in the State or locality *who are determined by the State health agency to be eligible and** who elect to participate in the benefits of the program, and that there will be no discrimination because of race, creed, color, or national origin, and no residence requirements";

Among the 14 who favored this modification were members who were opposed to the means test in principle, but felt the above modification was essential to a tolerant consideration of such legislation at the present time.

It was also felt by some that if the application of a means test was left to each State that the ultimate development through the Nation of efficient plans for medical care, such as considered here, would not be jeopardized.

*The modification is indicated by the italicized portion.

It was felt by others that this was a wholesome endorsement of State rights under such a program.

There was lengthy debate on the means of protecting medical education and through it the quality of medical care if such legislation as proposed in S. 1318 were enacted. The Committee was in general agreement that careful consideration of the effect of such legislation on medical education and the quality of future medical care were essential if both were to be protected. Though no formal vote was taken, the Committee felt that perpetuation of medical indigency was not a prerequisite to good medical teaching and better medical care.

While no formal expression of opinion was expressed, it was pointed out that provision for the remuneration at the same rate whether the professional services were rendered by groups of professional personnel, including teaching units, or by individuals was desirable both in terms of protecting the quality of teaching service and the interests of individual physicians or other professional personnel.

Designation of members of the advisory committees of the Children's Bureau as individuals representing no organization or as the official representative of an organization was suggested. It was furthermore urged that a member who was designated as the official representative of an organization be given the power of negotiating for that organization.

In the general session November 9 this report was adopted unanimously.

Statement made by

MARTHA M. ELIOT, M.D.
ASSOCIATE CHIEF, CHILDREN'S BUREAU
U. S. DEPARTMENT OF LABOR

At general session, November 9, 1945, of Children's Bureau Advisory Committee on Maternal and Child Health Services and Advisory Committee on Services for Crippled Children and by direction of the Advisory Committees to be attached to the Report of the Committee to Consider Basic Philosophy.

The policies of the Children's Bureau in its administration of the Emergency Maternity and Infant Care program have been referred to a number of times today and yesterday as possibly setting precedents that would not be desirable under a long-time program of services to mothers and children. The Emergency Maternity and Infant Care program was satisfactory only as an emergency program. The Children's Bureau recognizes that in the development of a long-time program, administrative authority of the Federal and State agencies must be clarified and definitely placed. I believe that a long-time program should be State administered. I believe that under the Emergency Maternity and Infant Care program more responsibility and initiative had to be taken by the Federal agency because of the emergency than would be desirable under a long-time program.

I would like to point out that S. 1318 is not an extension of the Emergency Maternity and Infant Care program for the following reasons:

1. The bill provides for an evolutionary development of the maternal and child health and crippled children's programs, State by State, over a 10-year period on the basis of local and State needs and resources for meeting these needs.

2. The bill gives to the States the initiative for development of and the responsibility for carrying out State policies and procedures necessary for the operation of the State plan. The role of the Federal agency would be to establish policies related to minimum standards for care and appropriate use of Federal funds to carry out the purposes of the legislation.

3. This bill makes provision on a legislative basis for methods of maintaining and improving quality of care, which, under the Emergency Maternity and Infant Care program, had to be felt to the Children's Bureau because of the emergency nature of that program.

4. The bill requires the Children's Bureau to obtain the advice of Federal advisory committees, both general and technical, and of the State administrators concerned, before establishing Federal policies to be used as guides in approving

State plans. Furthermore, the bill provides for the same type of cooperation between the State administrative officials and the professional and public groups concerned.

The question of maximum fees to be paid from Federal funds would, of course, have to be discussed and studied by the Bureau with the professional and governmental groups concerned.

The Children's Bureau believes that the program proposed under this bill (S. 1318) would be one essential segment of a national health program and that it can and must be fitted into an over-all medical care program as and when such is developed.

I would like to say further for Miss Lenroot and myself that we would have no objection to the transfer to another department with cabinet rank under conditions that would safeguard the integrity of the Children's Bureau and the services included in the Children's Bureau program. I would like to say further that Miss Lenroot and I would consider transfer of the Children's Bureau to an independent agency without cabinet rank as a great sacrifice for the Bureau.

MAJORITY REPORT OF COMMITTEE ON AVAILABILITY OF SERVICES AND FACILITIES

The meeting was opened by the Chairman reading subsection (3) of Section 103. Title I of S. 1318, the "Maternal and Child Welfare Act of 1945":

> "(3) provide that as services and facilities are furnished under the plan they shall be available to all mothers and children in the State or locality who elect to participate in the benefits of the program, and that there will be no discrimination because of race, creed, color, or national origin, and no residence requirements";

The subsection was then opened for general discussion. It was soon evident that there was a rather definite difference in opinion on making the services available to all mothers and children who elect to participate in the benefits of the program.

A number of the medical members present felt that the bill was unacceptable to the medical profession without the inclusion of a means test. To these the provision of services of this kind at public expense seemed an undesirable lessening of individual responsibility. It was brought out that any means test would have to be conducted on a local level and that administrative expenditures varying from 35 cents to 60 cents to 80 cents per family would be necessary to carry out such a test, and that probably in the groups close to the upper limit it might have to be repeated every six months. Some felt that the population could be divided into three classes—one that can afford to pay as they go for their medical care, a second group to which care would be available by prepayment, and finally the so-called medical indigent—and that this bill should apply only to the third group. It was suggested that a means test should be used for corrective medical services and not for preventive services.

Those in favor of the subsection, as read, felt that health like education was something to which every American child and mother during pregnancy and the post-partum period were entitled. That in view of the fact that 85 per cent of the families had an income of less than $2,500 per year, and 92 per cent less than $3,000, there would be no great group of children that would be getting this service undeservedly. On the one hand, it was brought out by one member that many people would use this service because they felt it was free. On the other hand, it was brought out that people who could afford to purchase private medical care would do so as indicated by the fact that the charity hospitals the country over were empty because people were able to pay for medical services at the present time.

After a considerable discussion, the matter was finally brought to a vote. The motion was made "That the means test should be used in the administration of the Pepper Act." The vote was 5 for the motion, and 8 against the motion.

In view of the fact that there was considerable opposition to the motion the Chairman suggested to the minority that they hand in a minority report.

The matter of availability of administrative and other facilities was discussed. It was particularly emphasized and brought out by Dr. Getting that the inauguration of a program under this bill would necessitate in the State of Massachusetts an increase of 75 times the work necessary in his department, and it was brought out that in the inauguration of any program it would of necessity be very gradual in getting under way.

It was further suggested that in view of the difference in medical facilities in various States and with the appropriation of funds by different States it would be necessary to see that individuals from one State could not avail themselves of services in another State and then return to their former homes. It was moved and seconded that by adding the words "domiciled in the State or locality" after "mothers" in subsection (3) this might be corrected. The motion was passed.

In the general session November 9, this report was adopted 29 to 16. The minority report follows.

MINORITY REPORT

The minority group of the Committee on Availability of Services and Facilities dissents from the report of the majority on the issue of providing a means test to determine eligibility of individuals or families for participation in the services provided under proposed Bill S.1318. The minority believes that to offer medical service to all, regardless of economic status, in any population group, is an unwise procedure because:

1. It encourages excessive dependence upon government and discourages individual self-reliance.

2. It tends to congest services intended primarily for the underprivileged and thus to deprive them of full benefits.

3. It places a needless and undesirable burden upon taxpayers, especially small taxpayers least able to bear it.

4. It competes unfairly with and tends to discourage established private and semi-private agencies already rendering meritorious service.

The majority believes in a suitable means test, to be determined at State levels after consultation with appropriate official and social service agencies and medical societies, applicable to medical care aspects only and exclusive of established public health procedures and diagnostic services in preventive medicine.

REPORT OF COMMITTEE ON METHODS OF REMUNERATION FOR PROFESSIONAL SERVICES

(1) This is a suggested change to the wording of lines 9-13, page 6, Sec. 103:

> "... payments to individual physicians and other professional personnel for care furnished under this title on a per capita, salary, per case, per session, or fee-for-service basis or any combination of these bases, the methods and amounts to be determined by the State agency after consideration with the professional groups or institutions rendering the service, provided further that such professional personnel, groups or institutions do not accept supplemental payments."

(2) We recommend that careful consideration be given to financial participation by the State where supplemental payments appropriate to differential standards of living are involved.

(3) It is moved to make the same changes on page 15, lines 15-18, as made in Sec. 103, page 6, lines 9-13.

(4) We recommend that in computing per diem cost for each hospital for reimbursement under this program, the basis be the cost of standard nonluxury accommodations.

In general session November 9, this report was adopted unanimously.

REPORT OF COMMITTEE ON SCOPE AND EXTENSION OF SERVICES AND METHODS OF COORDINATION WITH OTHER MEDICAL CARE PROGRAMS

The Committee directed its discussion to the principles which should be considered in reviewing the provisions of S.1318.

Requirement for Development of Services and Facilities Within Ten Years.—The Committee is of the opinion that designating a specific period of time has constructive value, and that it is reasonable to talk in terms of ten years. What is to be in effect at the end of the ten-year period must be defined in terms of what can be accomplished, taking into account all of the difficulties involved particularly those of obtaining trained personnel. This must be worked out by each State in its own particular terms.

Each State will be responsible for setting up its own plan, outlining how it proposes to reach the goal. To comply with the provisions of the bill as now written, this plan would have to be within the range of the facilities and services described in Sections 101 and 201. The Committee recognizes that States will move at different rates in relation to the various aspects of these services. However, one area of the State cannot be well served while another is left without service. Therefore, the Committee feels that availability of services and facilities on a State-wide basis 10 years after approval of the State plan is essential to a satisfactory State program.

The ten-year goal should be defined in general terms. It should not be written more specifically into the law than it is in S.1318. It should be possible after several years of experience to revise the statement of the goal. The advisory committee could at that time consider the problem and make fresh recommendations to the Bureau.

It is recommended that the ten-year period should be extended in the case of a State which offers an adequate reason for planning over a longer period, and shows evidence of continuous progress.

Services Outlined in S.1318 Adequate.—The description of services and facilities in Section 101 seem adequate. The words "preventive health work and diagnostic services" found in Section 101 should also be included in Section 201. This is a matter of emphasis, in order that this important phase of the program be given equal consideration with the curative and corrective services.

The words "dental care" should be added wherever appropriate to make clear that both medical and dental services are covered. Specifically, this should be done in the following places: Lines 14 and 23, page 5; lines 10 and 16, page 6; lines 3 and 9, page 7; line 3, page 11; and line 13, page 15.

The Committee recommends that appropriate language be inserted in the bill to clarify that the words "clinic and health service agency" include groups of physicians or dentists, to assure their inclusion in providing service in the States.

It is the consensus of the Committee that a child should be considered as a child until 21 years of age for child health and crippled children's services. This should be a maximum and not an obligatory age. Since the purpose of a lower age is frequently to avoid duplication of services, it is recommended that there be incorporated in the bill appropriate language to direct agreements governing the relation of these services to such other services.

Administration at the State Level.—The Committee supports the proposal in the bill that services for crippled children be administered or supervised by the State health agency after a date to be specified in the bill. The Committee recommends that the Children's Bureau formulate a statement of the reasons why this is desirable, to be submitted as part of its testimony at the hearings, and for such other use as is appropriate.

Coordination of Federal Programs.—It is the consensus of the Committee that the medical care program for mothers and children as set forth in S.1318 is a partial program. It is partial in that there are related services currently administered by other Federal agencies, such as the United States Public Health Service, the Office of Education, Vocational Rehabilitation, and Social Security Board. It is also partial in that there are services still not provided from any source.

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The Committee believes that there is an obligation on the part of all Federal agencies having related interests to arrive at common standards of administration, personnel, evaluations of service, policy, costs, etc. There should be a unified approach to the States as far as possible. It is recommended that the Children's Bureau accept this obligation and act on it to the fullest extent possible, and enter it into the record of the hearings on this bill.

In general session November 9, this report was adopted unanimously.

REPORT OF THE COMMITTEE ON RESEARCH PROJECTS AND METHODS OF ESTABLISHING STANDARDS OF CARE

Research is so basic to the efficiency of any program for maternal and child health that this committee recommends:

That much larger funds should be allocated to research than are provided in the Bill S.1318 or than have been available to the Bureau in the past.

Such funds are to be available to the Children's Bureau for such purposes as:

1. To undertake with its own personnel only such projects as can be best studied on a national scale; for example:
   (a) The evaluation of previous programs, such as maternal and infant mortality under the EMIC program, as a basis for administration of present and future programs.
   (b) A study of the effect of prolonged institutionalization on mental, physical, and social development.
   (c) Determination of the incidence of epidemic diarrhea in the newborn; methods of its prevention and control.
   (d) Evaluation of the facilities for the proper care of mental defectives.
   (e) In cooperation with other Government agencies, study of the incidence of poisoning of children by household products and methods of general education as to their dangers.
2. Allocation to medical schools or other organizations for specific research projects.
3. Coordination of the results of significant research studies throughout the world dealing with the problems of maternal and child welfare.

The committee recommends that the Children's Bureau establish a special advisory committee on research to aid them in the use of such funds as become available.

It is recognized that for the proper implementation of the program and advancement of public health, proper standards of care should be established and maintained. The committee believes:

That the paragraph related to this subject, in Bill S-1318, page 14, line 12, section B, reading:

> "standards for professional personnel rendering medical, dental, nursing, and related types of care or service and standards for hospital and other institutional care and services, such standards to be established by the State agency after consultation with professional advisory committees appointed by the State agency,"

should be modified by the addition of the phrase:

> "provided that these standards are not below certain minimum requirements set by the Children's Bureau after consultation with its advisory committee."

In general session November 9, this report was adopted unanimously.

COMMITTEE ON PROGRAMS OF PROFESSIONAL EDUCATION AND TRAINING

The Committee are agreed that the education and training of professional personnel must be of the highest quality, that they must be progressively improved, and that any legislation which violates these fundamental principles is undesirable.

As Bill S.1318 and similar legislation now stand, they may curtail teaching services. The Committee, while recognizing this threat to medical education, was unable to reach a conclusion as to how to avert it, particularly in the field of clinical obstetrics. However, to this end the following suggestions are made:

> That payments to hospitals shall be limited to those institutions in which the medical, nursing and all other professional services meet acceptable standards. Hospitals and other services staffed by qualified personnel would improve the educational facilities and thus the opportunities available to professional personnel as well as provide better care for the patient. The use of unqualified or partially trained personnel is detrimental to any health program and not in the public interest.
>
> Professional fees should be paid to teaching departments rendering services under the bill at the same rates as paid for services rendered by individuals or other professional groups.

It is the feeling of this Committee that until such time as there are available hospitals and facilities with sufficient qualified professional personnel to serve all regions in the United States, the services of qualified nurse-midwives are needed in some areas, provided they work under competent medical supervision with availability of hospital care as needed. To this end, training facilities for nurse-midwives should be expanded.

The Committee recommends that a portion of the appropriated funds be made available for the professional education of personnel; these funds to be expended to compensate accredited institutions for teaching and supervision and for scholarships to returning veterans and others in order to supply qualified personnel to regions in which they are needed to promote better maternal and child care.

Committee Members Present:

Dr. Fred Adair
Miss Kathleen Allen
Dr. Sterling H. Ashmun
Dr. Carl E. Badgley
Miss Bernadette Banker, R.N.
Dr. W. W. Bauer
Dr. Leona Baumgartner
Dr. Jessie Bierman
Dr. M. O. Bousfield
Dr. James Barrett Brown
Dr. Robin C. Buerki
Dr. Allan M. Butler
Dr. George D. Cannon
Dr. John W. Chenault
Miss Hazel Corbin
Miss Ruth Council
Dr. M. Edward Davis
Dr. W. C. Davison
Dr. Robert L. DeNormandie
Dr. Nicholson J. Eastman
Mrs. Gertrude Folendorf, R.N.
Dr. Louise Galvin
Dr. Harvey F. Garrison
Dr. Franklin P. Gengenbach
Dr. Stanley Gibson
Dr. Arthur Bruce Gill
Dr. Eleanor Harvey
Dr. Henry F. Helmholz
Miss Ruth Houlton, R.N.
Dr. T. Duckett Jones
Miss Isabelle Jordan, R.N.
Mrs. Mary Wysor Keefer
Dr. George Kosmak
Dr. Leon Kramer
Mr. Lawrence Linck
Dr. Francis E. Lord
Miss Mary MacDonald, R.N.
Dr. Basil MacLean
Dr. Alexander T. Martin
Dr. Alice F. Maxwell
Dr. Oscar L. Miller
Dr. Oren Moore
Miss Olivia T. Peterson, R.N.
Dr. Alice M. Pickett
Dr. E. D. Plass
Dr. Grover F. Powers

The Committee believes that there is an obligation on the part of all Federal agencies having related interests to arrive at common standards of administration, personnel, evaluations of service, policy, costs, etc. There should be a unified approach to the States as far as possible. It is recommended that the Children's Bureau accept this obligation and act on it to the fullest extent possible, and enter it into the record of the hearings on this bill.

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That the paragraph related to this subject, in Bill S-1318, page 14, line 12, section B, reading:

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COMMITTEE ON PROGRAMS OF PROFESSIONAL EDUCATION AND TRAINING

The Committee are agreed that the education and training of professional personnel must be of the highest quality, that they must be progressively improved, and that any legislation which violates these fundamental principles is undesirable.

As Bill S.1318 and similar legislation now stand, they may curtail teaching services. The Committee, while recognizing this threat to medical education, was unable to reach a conclusion as to how to avert it, particularly in the field of clinical obstetrics. However, to this end the following suggestions are made:

That payments to hospitals shall be limited to those institutions in which the medical, nursing and all other professional services meet acceptable standards. Hospitals and other services staffed by qualified personnel would improve the educational facilities and thus the opportunities available to professional personnel as well as provide better care for the patient. The use of unqualified or partially trained personnel is detrimental to any health program and not in the public interest.

Professional fees should be paid to teaching departments rendering services under the bill at the same rates as paid for services rendered by individuals or other professional groups.

It is the feeling of this Committee that until such time as there are available hospitals and facilities with sufficient qualified professional personnel to serve all regions in the United States, the services of qualified nurse-midwives are needed in some areas, provided they work under competent medical supervision with availability of hospital care as needed. To this end, training facilities for nurse-midwives should be expanded.

The Committee recommends that a portion of the appropriated funds be made available for the professional education of personnel; these funds to be expended to compensate accredited institutions for teaching and supervision and for scholarships to returning veterans and others in order to supply qualified personnel to regions in which they are needed to promote better maternal and child care.

Committee Members Present:

Dr. Fred Adair
Miss Kathleen Allen
Dr. Sterling H. Ashmun
Dr. Carl E. Badgley
Miss Bernadette Banker, R.N.
Dr. W. W. Bauer
Dr. Leona Baumgartner
Dr. Jessie Bierman
Dr. M. O. Bousfield
Dr. James Barrett Brown
Dr. Robin C. Buerki
Dr. Allan M. Butler
Dr. George D. Cannon
Dr. John W. Chenault
Miss Hazel Corbin
Miss Ruth Council
Dr. M. Edward Davis
Dr. W. C. Davison
Dr. Robert L. DeNormandie
Dr. Nicholson J. Eastman
Mrs. Gertrude Folendorf, R.N.
Dr. Louise Galvin
Dr. Harvey F. Garrison
Dr. Franklin P. Gengenbach
Dr. Stanley Gibson
Dr. Arthur Bruce Gill
Dr. Eleanor Harvey
Dr. Henry F. Helmholz
Miss Ruth Houlton, R.N.
Dr. T. Duckett Jones
Miss Isabelle Jordan, R.N.
Mrs. Mary Wysor Keefer
Dr. George Kosmak
Dr. Leon Kramer
Mr. Lawrence Linck
Dr. Francis E. Lord
Miss Mary MacDonald, R.N.
Dr. Basil MacLean
Dr. Alexander T. Martin
Dr. Alice F. Maxwell
Dr. Oscar L. Miller
Dr. Oren Moore
Miss Olivia T. Peterson, R.N.
Dr. Alice M. Pickett
Dr. E. D. Plass
Dr. Grover F. Powers

Dr. John Z. Preston
Dr. Ruth Raattama
Dr. Edward S. Rogers
Miss Marion Sheahan
Miss Ruth Sleeper, R.N.
Dr. Francis S. Smyth
Miss Mabel Staupers, R.N.
Dr. George Stevenson
Miss Jessie Stevenson, R.N.
Miss Isabelle Stewart, R.N.
Mrs. Zephyr Holman Stewart
Mr. R. C. Thompson
Dr. S. A. Thompson
Dr. Felix Underwood
Dr. Joseph S. Wall
Dr. Philip F. Williams
Dr. James Wilson

Guests:

Dr. Walter L. Bierring
Dr. Otto W. Brandhorst
Dr. Kenneth A. Easlick
Dr. Vlado A. Getting
Dr. John P. Hubbard
Miss Kate McMahon
Dr. Duncan Reid
Dr. I. C. Riggin
Dr. Isaac Schour
Dr. J. E. M. Thomson
Miss Lute Troutt
Dr. R. M. Walls
Dr. Wm. C. Webb, Jr.

Comment

ANNUAL MEETING AT DETROIT

Owing to the closeness of the time of the Annual Meeting to the dead line for closing forms for the February JOURNAL, the full report of the Fourteenth Annual Meeting in Detroit, Jan. 15-18, 1946, will not appear until March. Certain committee reports and the regional reports which were available previous to the meeting appear in this issue. There was a large attendance and many were present who had only recently been released from military service.

In addition to a day of clinics at Detroit hospitals, the scientific programs were excellent and well attended.

Two matters, however, overshadowed the meeting. One was the report of the Committee on the Academy Study of Medical Care for Children. This was presented to the Academy as a whole and at a dinner meeting to the State Chairmen, upon whom much of the actual work will fall. The feeling of everyone was that the Academy has undertaken a tremendous task, a far greater one in its development than was in the mind of anyone when the study was voted at the meeting in St. Louis in 1944. The Academy is committed to the study which is well under way and it must be carried through. As every one realized at Detroit, it will mean work and time on the part of every member if worth-while results are to be obtained.

Overshadowing all else was the question of Federal legislation in the field of medicine. Perhaps too much discussion was directed to past history. The important thing is that a number of bills are before committees in Congress and the medical profession must constructively criticize the proposals, pointing out the changes which are necessary before the proposals are not only acceptable to the medical profession, but also will bring about the objectives of the bills. There was an almost unanimous opinion that the Pepper bill as now written will not bring about improved medical care for children. At the final session a rather general resolution was passed stating the attitude of the Academy on Federal legislation, and a secondary resolution stating thirteen points or objections to the Pepper bill. The resolution adopted is as follows:

RESOLUTION ADOPTED BY THE ACADEMY JAN. 18, 1946

The American Academy of Pediatrics in annual session at Detroit, Mich., Jan. 15-18, 1946, after careful consideration of proposed legislation in Congress as it relates to child health services reaffirms its resolution as adopted at its 1939 session, namely:

"That the American Academy of Pediatrics, regarding the provisions for maternal and child welfare, favors the use of public funds to provide *such services* to *those groups of the population unable to pay for medical services*, to the end that the standards or medical care may be maintained at a high level among such groups."

The Academy of Pediatrics does not favor the use of Federal funds for those able to provide good medical care from their own resources.

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The Academy of Pediatrics does not favor the use of Federal funds for those able to provide good medical care from their own resources.

The Academy directs the attention of those considering proposed legislation to its fact-finding study of child health services now in progress which, at its conclusion, should assist in the development of sound programs at state levels based on demonstrated needs.

Pending the completion of this study, it is recognized that urgent needs exist in some states that should be met in the immediate future. To this end the Academy recommends that additional Federal funds be made available for grants-in-aid to the states under existing Maternal and Child Health and Crippled Children's programs of Title V of the Social Security Act as amended in 1939.

The Academy would welcome the privilege of sending representatives now or at any time to confer with those responsible for the preparation of legislation pertaining to child health.

The supplemental resolution adopted was as follows:

The American Academy of Pediatrics makes the following specific criticisms of S. 1318.

1. The bill as now written states that services and facilities furnished under the state plans are to be available to all mothers and children who elect to participate in the benefits and therefore denies to the States the right to determine eligibility.

2. The bill excludes fee-for-service as a means of paying practitioners for service rendered.

3. The bill makes inadequate provision for paying groups of physicians or institutions for professional services rendered.

4. The bill does not specify that professional personnel, groups, or institutions do not accept supplemental payments.

5. The bill endorses the Children's Bureau as the most suitable administrative agency of this major step in a National Health Program without assuring integration of the administrative functions and health services under this bill with other health activities of the government.

6. The bill does not satisfactorily define the Federal or State advisory committees as regards personnel, method of appointment, advisory and policy making roles, or manner of giving authority to the record of consultations with and recommendations to the administrators at Federal and State levels.

7. The bill makes no provision for variation in remuneration for service according to the differing costs pertaining in various states.

8. The bill makes no provision for the prevention of arbitrary requests on short notice by the Federal administrative agency for reports from the State health agencies and similarly arbitrary requests by the State health agencies for reports from those rendering services.

9. The provisions for handling claims are unsatisfactory.

10. The bill fails to specify adequately reference to coverage of dental care in appropriate portions of the bill.

11. The bill makes no adequate provision for the protection of the well-organized and integrated teaching services on which the future quality of medical care is so dependent.

12. The bill makes inadequate provision for the support and encouragement of research pertaining to the improvement of maternal and child health services and medical care.

13. The bill makes no provision for assuring that State plans be expanded at rates that do not exceed available administrative and professional personnel and resources and that assurance against too rapid expansion be considered as one of the criteria of approval of a State plan by the Federal agency.

For these reasons the American Academy of Pediatrics believes that the Maternal and Child Welfare Act of 1945 (S. 1318) does not represent the best form of legislation for the purpose for which it was written.

At the Business Meeting on Friday, January 18, Dr. Edwards Park of Baltimore was awarded the "Borden Award." The "Mead Johnson Awards" were not awarded this year.

Dr. Jay I. Durand of Seattle was elected president for 1946 and Dr. Lee Forrest Hill of Des Moines, vice-president. Dr. George F. Munns of Winnetka, Ill., was elected to the Chairmanship of Region III.

A special committee on redistricting the Academy, changing the present four districts to nine, was presented for study and action at the next Annual Meeting.

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